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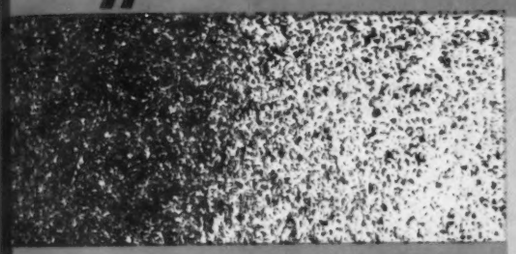
PTEMBER 3, 1942

The IRON AGE

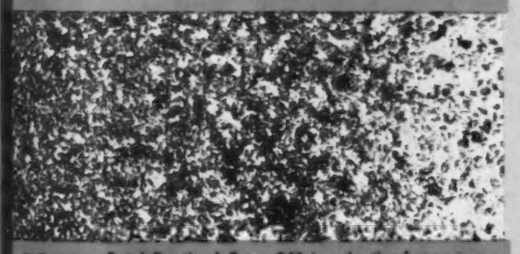
SEP 4 1942

HOLDEN

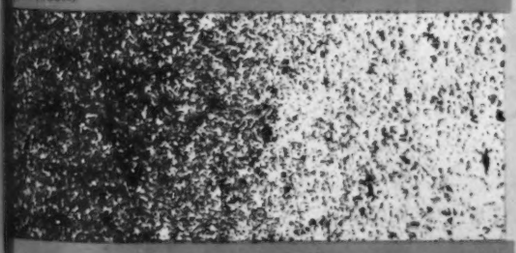
Liquid Carburizing Baths



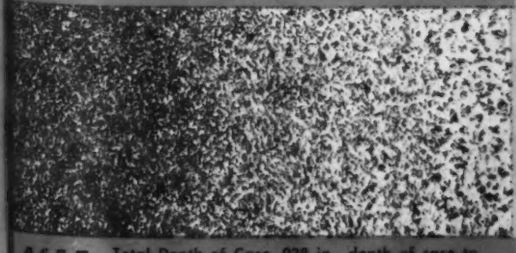
1020 Total Depth of Case .038 in., depth to .35 carbon .030 in., depth in excess of .80% carbon Carbon content of 1st .005 in. turned from surface 1.034, 2nd .948, 3rd .005 in. .807, 4th .005 in. .639, 5th .005 in. .509 (100X)



1315 Total Depth of Case .047 in., depth of case to .35 carbon .040 in., depth of case in excess of .019 in. Carbon content of 1st .005 in. turned from surface, 2nd .005 in. 1.007, 3rd .005 in. .846, 4th .005 in. .752, 5th .644 (100X)



3115 Total Depth of Case .038 in., depth to .35 carbon .032 in., depth in excess of .80% carbon Carbon content of 1st .005 in. turned from surface 1.007, 2nd .935, 3rd .005 in. .823, 4th .005 in. .670, 5th .005 in. .538 (100X)



4615 Total Depth of Case .038 in., depth of case to .35 carbon .030 in., depth of case in excess of .015 in. Carbon content of 1st .005 in. turned from surface .2nd .005 in. .895, 3rd .005 in. .815, 4th .005 in. .660, 5th .005 (100X)

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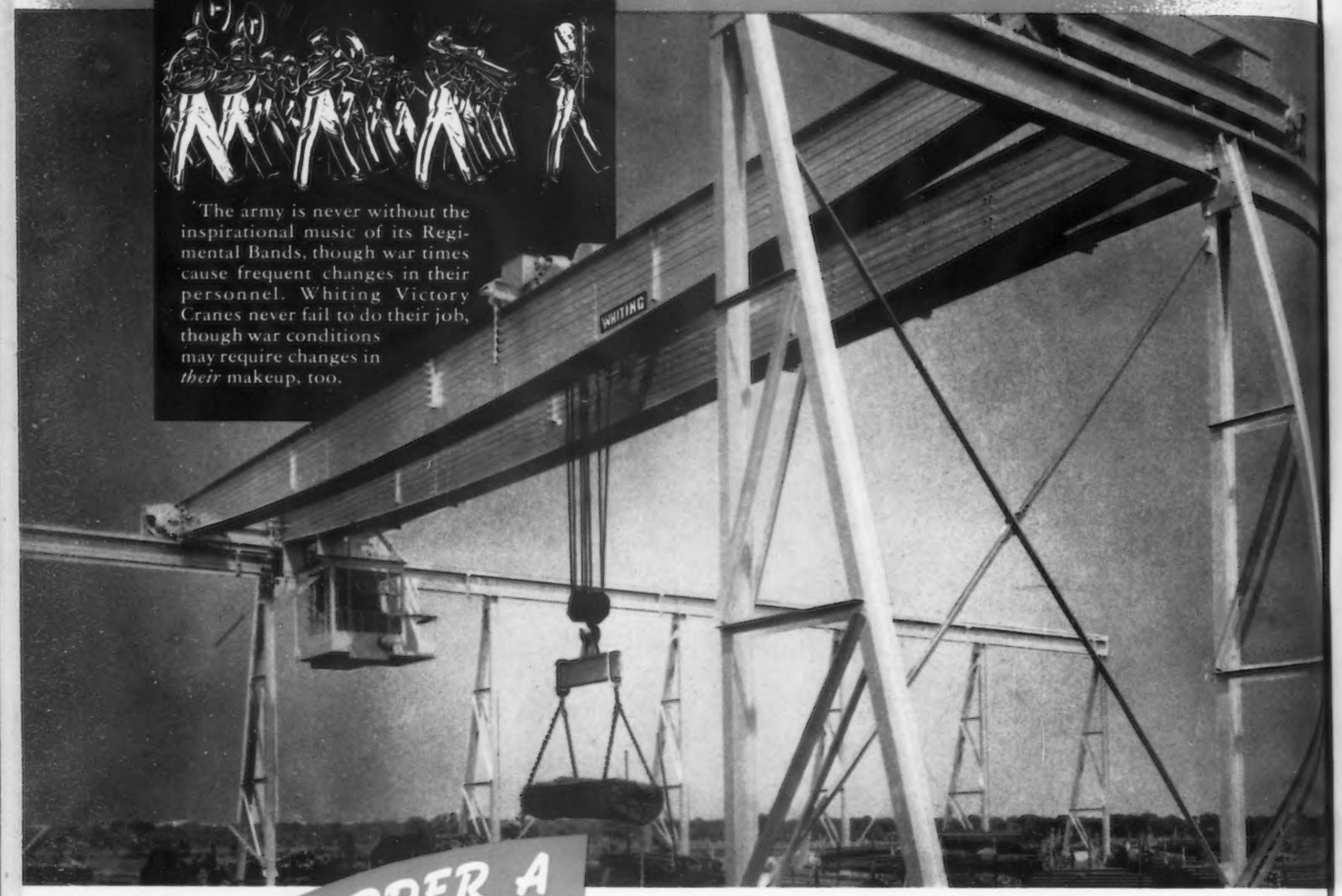

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SEPTEMBER 3, 1942

VOL. 150, NO. 10

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"SW" ...the electrode that has OUTGROWN ITS INITIALS*

*To describe the job it was designed to do... sheet welding... this electrode was named "SW".

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"SW" can be used in any position.

"SW" can be used for all types of fabrication welding, but especially for light sheet metal work and other jobs requiring low heat input to work.

"SW" is supplied in 3/32", 1/8", 5/32", 3/16", 7/32" and 1/4" diameters.

"SW" meets code requirements of A.W.S. and A.S.T.M. Tentative Electrode specifications for classifications E-7010, E-7011, E-6012 and E-6013.

Flexarc "SW" electrode was developed especially for welding light sheet steels, and particularly for use with low capacity a-c welders. And how it filled the bill! Any reasonably skillful welder could make a good sound weld on sheets as thin as 1/32", using 3/32" diameter "SW"—without danger of burn-through.

But that's not all.

Users found "SW" equally well adapted to heavy gauge metal and all types of general steel welding. They liked its uniform metal transfer, its easy arc strike. Then when they found it could be used in all different positions using a-c or d-c, they demanded "SW" in larger diameters. That's why you can now get "SW" in diameters from 3/32" to 1/4". Try it! Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N. J-21195

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Flexarc FP—Use FP with a-c and d-c for *fillet position* and general purpose high-speed welding on low and medium carbon steels.

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FLEXARC ELECTRODES

THE IRON AGE

SEPTEMBER 3, 1942

ESTABLISHED 1855

Less Paper—More Head and Foot Work

THIS country has a capacity for producing steel, and a performance too, that is greater than all the rest of the world. It is inconceivable that if non-essential uses of this precious metal are curtailed, we should not have enough available for all war purposes.

Eighty million tons of steel or more a year is a lot of steel. Enough to build 240 first class battleships—if we wanted them—or a merchant fleet of cargo ships four times the total tonnage of Great Britain's floating merchant marine empire.

Putting it all into M-4 tanks, we could make 2,660,000 of them, enough tanks to stretch, end to end, nearly half way around the globe at the equator.

Putting this annual steel output of ours into three-inch shells would give us enough to fire one per second for the next 250 years.

Of course, we don't want it that way, but these comparisons will give you an idea of what our steel capacity and production amount to in terms of war material. Hitler would sell his soul to have it were that questionable asset of his not already sold to the devil.

With this tremendous and enviable capacity to produce, why is it that we are encountering shortages? Maybe it's because, in working out the channels of flow of the steel that we have, we are depending too much on paper work and too little on head and foot work.

That has happened plenty of times before in private industry, as most any practical production man can tell you.

One of the foremost of our past American "efficiency engineers" put a "system" some years ago into a Midwest manufacturing plant. Theoretically, the foundry, forge shop, machine shop and other departments of this plant had sufficient capacity to meet all demands for parts for shipments. But deliveries were from three to six months behind and bottlenecks were a daily happening.

The expert installed dispatch boards, production slide rules, red tags, green tags and white tags plus the most complete and elaborate system of paper forms that one could imagine. And deliveries got still further behind.

Then the practical-minded general manager organized a staff of "chasers." Trouble men who knew what things were about, who "lived" in the departments and who came "a-running" to the front office only when things went amiss and needed attention. Shortages and bottlenecks then began to evaporate together with slide rules and fancy forms, and delivery dates were met promptly.

Sometimes it's not what you've got that's not enough, but what you do with what you've got. And in such cases, head and foot work beats paper work all to pieces.

J. H. Van Deventer

The freighter L. E. Block, unloading ore at the Indiana Harbor works of Inland Steel Co. Capt. Kizer on the bridge.

Inland Fleet Breaks Records

Carrying Ore to the Mills for War Production

Every freighter of the Inland Steel Co. fleet has broken its all-time cargo-carrying record since the opening of spring navigation. The L. E. Block, flagship of the fleet, recently docked with 16,348 tons of iron ore—a new tonnage record for the Inland freighters. Before mid-summer the L. E. Block already had made 18 round trips—six of which set new tonnage records.

This performance of the Inland fleet is in answer to the tremendous wartime demand for steel. Not only must enough ore, limestone and coal be delivered at Indiana Harbor to maintain present above-capacity ingot production—but enormous additional tonnages must be put in huge stock piles for ready use during the long winter months when navigation is closed on the Great Lakes.

The men who sail the Inland lake freighters, like the men who tend the Inland furnaces and rolling mills, are working day and night to do their part in winning the war. They will bring down more ore—make more steel—until those who threaten liberty have been conquered.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE • STRUCTURALS • PILING
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Foolproof Gaging System

Developed by Army Ordnance

By J. B. NEALEY

. . . Arms plants are now using an improved system of gaging developed by the U. S. Army Ordnance Department. With this system of dimensional control, all gage makers' tolerances are within the limits set on the work instead of being centered on the upper and lower limits. Furthermore, the tolerances on the inspection and work gages have been so set with respect to each other as to assure positively interchangeability of components in mass production. Because of the scientific soundness of the Ordnance gage system, it is likely that it will replace present commercial practice throughout American industry in the near future.

WHILE civilian industry has long boasted of its manufacture of interchangeable parts on a mass production basis, made possible by dimensional control, the manufacture of certain military weapons requires an even greater degree of accuracy than is ordinarily used in production by civilian industry. Faced with this problem, the Ordnance Department has carefully developed a new system of gaging. The system is admirably suited to the manufacture of Ordnance materiel which is subject to approval by Ordnance inspectors using Ordnance inspection gages. There is little doubt that this system is the best yet developed in any country in the world.

Many factories working on military items have adopted this system of gaging and are loud in its praise. It is with the idea of explaining this system to industry in general that the following detail is given.

Proved by Experience

Take, for example, the experience of a world famed producer of firearms. The Ordnance Department recently gave this concern an $80,000,000 contract for equipping a plant and producing 0.30 and 0.50 cal. machine guns. There are well over 300 major parts to this gun, which involves 3500 machine operations, a large proportion of which must be gaged. The Ordnance system of gaging was adopted by this corporation and was found to be of enormous benefit in actual service and worth more than any inconveniences which may have been experienced in its first application.

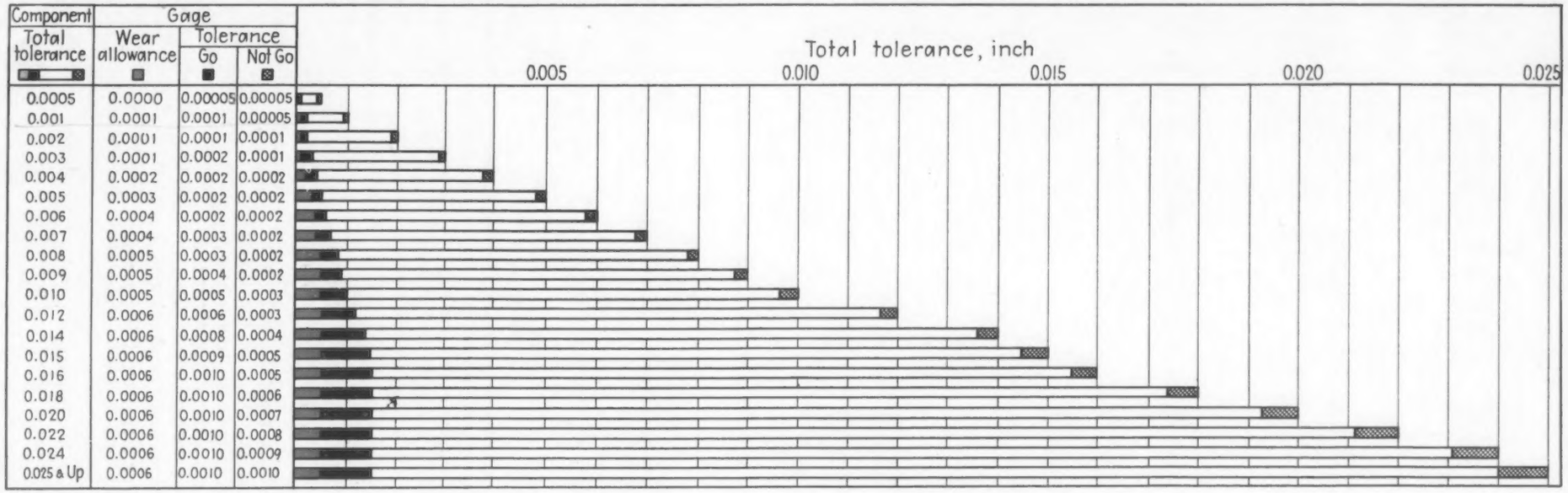
All drawings for the gun, together with the drawings for the U. S. Inspection gages, were furnished by the Ordnance Department complete in all details. It has been found that, ignoring minor discrepancies, the gun when made in strict accordance with the Ordnance Department drawings functions with unbelievable reliability. For instance, a gun picked at random has been fired 26,000 rounds without any malfunction whatsoever and without breakage or serious wear of any part. The Ordnance Department was also of great assistance in the procurement of machine tools, and the Small Arms Section of the Office of the Chief of Ordnance has been, and is being, of constant help in the solution of technical problems which arise in connection with the production.

The War Department in general has thrown open to the company all of its resources. For example, the gage inspection laboratory at this particular plant was patterned closely after the laboratory at one of the arsenals, whose personnel cooperated unstintingly in providing the necessary information.

The Ordnance Department system of controlling gages is also employed with great success. Traveling gage inspectors make frequent checkups of gages in use and keep detailed records of wear, so that gages may not only be replaced at the proper time, but also records may be built up from which the life of all gages may be accurately predicted. For example, certain thread gages have been found to wear to the point of unserviceability in periods as short as four or five days, and it is obvious that unless frequently checked, gages may accept a great deal of defective work. By maintaining a careful control of such danger points, the gages may be withdrawn from the job and replaced with new ones in time to prevent the acceptance of bad work. Needless to say, this is a very important factor to insure interchangeability of the component

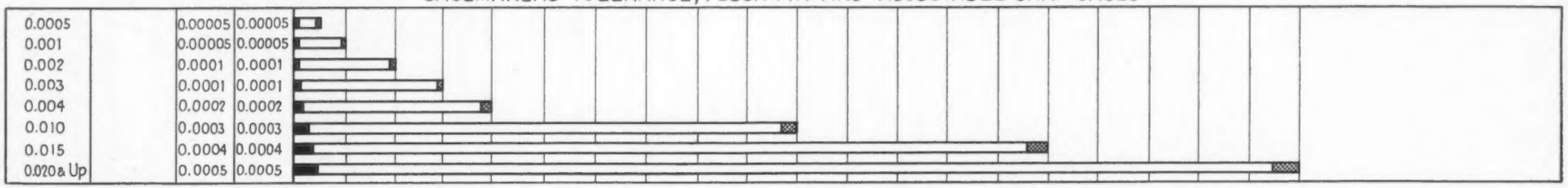
WEAR ALLOWANCES AND GAGEMAKERS TOLERANCES, PLAIN PLUG AND PLAIN RING INSPECTION GAGES INCLUDING PLAIN RING GAGES FOR MAJOR DIAMETER OF SCREWS, AND PLAIN PLUG GAGES FOR MINOR DIAMETER OF NUTS

Component	Gage		
Total tolerance	Wear allowance	Tolerance	
		Go	Not Go
0.0005	0.0000	0.00005	0.00005
0.001	0.0001	0.0001	0.00005
0.002	0.0001	0.0001	0.0001
0.003	0.0001	0.0002	0.0001
0.004	0.0002	0.0002	0.0002
0.005	0.0003	0.0002	0.0002
0.006	0.0004	0.0002	0.0002
0.007	0.0004	0.0003	0.0002
0.008	0.0005	0.0003	0.0002
0.009	0.0005	0.0004	0.0002
0.010	0.0005	0.0005	0.0003
0.012	0.0006	0.0006	0.0003
0.014	0.0006	0.0008	0.0004
0.015	0.0006	0.0009	0.0005
0.016	0.0006	0.0010	0.0005
0.018	0.0006	0.0010	0.0006
0.020	0.0006	0.0010	0.0007
0.022	0.0006	0.0010	0.0008
0.024	0.0006	0.0010	0.0009
0.025 & Up	0.0006	0.0010	0.0010



GAGEMAKERS TOLERANCE, FLUSH PIN AND ADJUSTABLE SNAP GAGES

0.0005		0.00005	0.00005
0.001		0.00005	0.00005
0.002		0.0001	0.0001
0.003		0.0001	0.0001
0.004		0.0002	0.0002
0.010		0.0003	0.0003
0.015		0.0004	0.0004
0.020 & Up		0.0005	0.0005



N O T E S

This chart shows, both numerically and graphically, wear allowances and gagemakers tolerances for inspection gages.

For component tolerances not listed, the next smaller tolerance shall be used

The first four columns show numerical values, while the following portion of the table shows graphic values

Column 1 shows the total tolerance on the product Column 2 the wear allowance on the "go" gage Column 3 the tolerance on the "go" gage, and column 4 the tolerance on the "not go" gage

There is no wear allowance on the "not go" gage because it wears toward the "go" gage and in the direction of safety

parts and to maintain the high degree of precision required by the Ordnance Department.

New and Old Systems Compared

In the Ordnance system, the difference between work and inspection gages is predicated on a very logically and carefully planned system of wear allowances and tolerances, rather than on the application of arbitrary differences. This system is based on the fact that gages cannot be built to exact figures but, like all other things, must be made within a permissible tolerance of accuracy; also on the fact that they are subject to wear. Therefore, the system takes into account the tolerance required on the dimensions for the gagemaker, as well as an allowance for the wear which will inevitably occur when the gage is in use, with the purpose in mind of controlling both these factors so that satisfactory components can still be produced.

It goes further in that it recognizes the fact that work gages, in general, will wear more than inspection gages due to their greater usage, and that some difference must be allowed between the inspection gage and the work gage otherwise, the part which passes the work gage after it has been in use a short time may not pass the inspection gage, due to the normal wear to which the work gage is subjected. The system has been worked out in the greatest detail for all common kinds of gages such as snap, ring, plug and flush-pin types, and for all the usual tolerances encountered on the part drawings of small arms components.

The *Inspection* gage is designed so that the necessary gagemaker's tolerance in producing the gage is applied within the tolerances indicated on the component drawing; and in addition, a wear allowance is provided, also within the tolerances shown on the component part drawing, so that the gage may have a reasonable length of useful life before it must be retired due to wear. See Chart I.

The *work* gage is designed so that it also has gagemaker's tolerances and a wear allowance applied to it, not only within the limits shown on the component part drawing, but also within the limits shown on the inspection gage, so that the work gage may have a reasonable life of usefulness before it is worn to the point where it will meet or exceed the size on the inspection gage as noted in Chart II. To facilitate the control of the work gage, it is marked in such a way that when the actual measurement as taken by the gage inspector, has reached the amount indicated by the marking, the gage must be retired.

The gagemaker's tolerance and wear allowances are both charted for all of the component tolerances usually encountered in steps of 0.001 in. For example, in Fig. 1, a "Go" and "Not Go" snap gage is being provided to measure a component with a tolerance of 1.750 to 1.755 in. The older practice would have been to provide a snap gage to the figures of the component tolerances without gagemaker's tolerances or wear allowances as shown at *A*. This obsolete system is not sufficiently accurate for present day production of Ordnance materiel, due to the fact that the gage theoretically can be used only once (since with every use some wear occurs); also no limit of accuracy is specified to which the gage maker must work. No such gage could possibly be produced to flat figures with no tolerance of accuracy whatsoever, except at enormous expense and then discrepancies of a few millionths per inch of size would usually be found under laboratory conditions.

Work Gages

The development of the work gage *D* is shown directly below the inspection gage *C*, Fig. 1. Although the figures ultimately arrived at for the work gage are within the inside limits of the inspection gage, for convenience in use, the work gage chart of wear allowances and gagemaker's tolerances is based on the figures shown on the component drawings.

Consulting Chart II reveals that

working

Gage type	Comp. toler.	GO		NOT GO		Δ
		Wear allow.	Gage toler.	Wear allow.	Gage toler.	
PLUG, SNAP AND RING	0.0005	0.00015	0.00005	0.0000	0.00005	0.0001
	0.001	0.0003	0.0001	0.0000	0.00005	0.0002
	0.002	0.0003	0.0001	0.0001	0.0001	0.0002
	0.003	0.0004	0.0002	0.0001	0.0001	0.0003
	0.004	0.0006	0.0002	0.0002	0.0001	0.0004
	0.005	0.0007	0.0002	0.0002	0.0002	0.0005
	0.006	0.0008	0.0002	0.0002	0.0002	0.0006
	0.007	0.0009	0.0002	0.0002	0.0002	0.0007
	0.008	0.0010	0.0002	0.0002	0.0002	0.0008
	0.009	0.0011	0.0003	0.0002	0.0002	0.0009
	0.010	0.0012	0.0004	0.0003	0.0002	0.0010
	0.012	0.0015	0.0005	0.0003	0.0003	0.0012
	0.014	0.0017	0.0006	0.0004	0.0003	0.0014
	0.015	0.0018	0.0007	0.0005	0.0004	0.0015
	0.016	0.0020	0.0008	0.0005	0.0004	0.0016
	0.018	0.0020	0.0009	0.0006	0.0005	0.0016
	0.020	0.0020	0.0010	0.0007	0.0006	0.0016
	0.022	0.0020	0.0010	0.0008	0.0007	0.0016
	0.024	0.0020	0.0010	0.0009	0.0008	0.0016
	0.025	0.0020	0.0010	0.0010	0.0010	0.0016
	0.030	0.0022	0.0012	0.0010	0.0010	0.0016
	0.040	0.0024	0.0015	0.0010	0.0012	0.0016
	0.050	0.0025	0.0018	0.0010	0.0015	0.0016
	0.065	0.0025	0.0020	0.0010	0.0017	0.0016
	0.100	0.0030	0.0020	0.0010	0.0020	0.0016
ADJUSTABLE GAGES AND FLUSH PIN	0.0005	0.0001	0.0000	0.0000	0.0000	0.0000
	0.001	0.0001	0.0001	0.0000	0.0001	0.0000
	0.002	0.0002	0.0001	0.0001	0.0001	0.0001
	0.003	0.0002	0.0002	0.0001	0.0001	0.0001
	0.004	0.0003	0.0002	0.0002	0.0001	0.0002
	0.006	0.0004	0.0002	0.0003	0.0002	0.0002
	0.010	0.0005	0.0002	0.0005	0.0002	0.0003
	0.015	0.0006	0.0003	0.0006	0.0003	0.0004
	0.020	0.0007	0.0004	0.0007	0.0004	0.0005
	0.025	0.0007	0.0005	0.0007	0.0005	0.0005
	0.030	0.0007	0.0006	0.0007	0.0006	0.0005
	0.040	0.0007	0.0008	0.0007	0.0008	0.0005
	0.050	0.0007	0.0010	0.0007	0.0010	0.0005
	0.065	0.0008	0.0010	0.0007	0.0012	0.0005
	0.100	0.0010	0.0015	0.0010	0.0015	0.0005

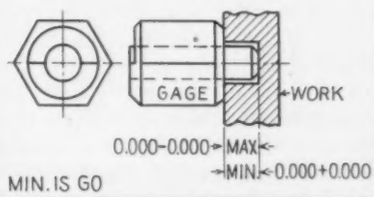
DIMENSIONS

PLUG { GO: ADD ALLOW. AND APPLY TOLER + / NOT GO: SUBTRACT ALLOW. AND APPLY TOLER - }

SNAP AND RING { GO: SUBTRACT ALLOW. AND APPLY TOLER - / NOT GO: ADD ALLOW. AND APPLY TOLER + }

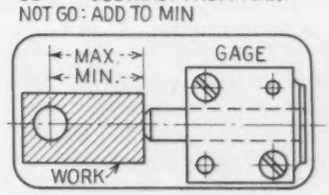
FLUSH PIN { SEE TYPE A / SEE TYPE B }

A — GO: ADD TO MIN. / NOT GO: SUBTRACT FROM MAX



MIN. IS GO

B — GO: SUBTRACT FROM MAX. / NOT GO: ADD TO MIN



MAX. IS GO

MARKINGS

FOR MARKING "GO"

ADD Δ TO, OR SUBTRACT Δ FROM, THE COMPONENT DIMENSIONS, AS FOLLOWS:-

PLUG: ADD
SNAP (PLAIN AND ADJUSTABLE): SUBTRACT
RING: SUBTRACT
FLUSH PIN { IF TYPE A: ADD TO MIN / IF TYPE B: SUBTRACT FROM MAX. }

FOR MARKING "NOT GO"

ON ALL GAGES: USE ACTUAL SIZE OF NOT GO GAGE. (GAGE MAKERS TOLERANCE NOT INCLUDED)

for a component tolerance of 0.005 in., the wear allowance for the Go side is 0.0007 in. and the gagemaker's tolerance is 0.0002 in. Starting with the maximum component limit of 1.7550 in. and consulting the chart, we find that the 0.0007 in. wear allowance for the Go side of a snap gage is subtracted, and that the 0.0002 in. gagemaker's tolerance is to be applied in a minus direction. Therefore, subtracting 0.0007 in. from 1.7550 in., we get 1.7543 in. and this figure is shown on the work gage drawing on the Go side with a tolerance of minus 0.0002 in. in accordance with Chart II.

Referring again to Chart II, it is found that the work gage wear allowance on the Not Go side is 0.0002 in. and that the gagemaker's tolerance is also 0.0002 in. In this case they are both applied in a plus direction. The 0.0002 in. wear allowance is therefore added to the minimum component limit of 1.7500 in. to give the size to which the Not Go side of the gage must be made, in this example 1.7502 in. plus 0.0002 in., as shown in the illustration at *D*.

It will be observed that the figures for the work gage are within the figures of the inspection gage. Referring again to Chart II, it is found that the Go side of the work gage should be *marked* 0.0005 in. less than the maximum component dimension and that the Not Go side of the gage should be *marked* to the actual size of the Not Go side, with the gagemaker's tolerance disregarded, in this case 1.7502 in.

Some confusion occasionally arises from the fact that the gage limit to be stamped on the Go side of the work gage does not correspond with the figure to which the Go side of the gage is to be made or, at first glance, with anything else. However, refer to the Go side of the inspection gage and note that in the illustration *C* the figure is 1.7547 in. minus 0.0002 in., making it possible for this side of the gage to be either 1.7547 in. or 1.7545 in. or any point in between. Insofar as work passing the work gage and not passing the inspection gage is concerned, the worst figure would be 1.7545. Referring once again to the *marking* of the work gage, the figure is 1.7545. In other words, in this example, 1.7545 in. is the figure beyond which the Go side of the work gage should not be allowed to wear if work passed by it is to be accepted by the inspection gage. Therefore, the marking of the work gage is a sort of red signal to the gage inspector so that he may know without further reference to the chart or anything else, that once the gage has worn to the figure marked, it must be returned and replaced.

Inspection Gages

The development of the inspection gage for this example is shown at *C* in Fig. 1. Since there is a tolerance of 0.005 in. on the component drawing, it is found by referring to Chart I for inspection gages that a component tolerance of 0.005 in. carries a wear allowance of 0.0003 in. on the Go side of the gage and that the gagemaker's tolerance on the Go side of the gage is 0.0002 in. Starting with the maximum component figure of 1.7550 in. for the Go side of the gage, the 0.0003 in. wear allowance is subtracted leaving a figure 1.7547 in. The gagemaker's tolerance of 0.0002 in. is also to be applied in a minus direction in this case. This is the direction which will keep the gage figures within the tolerances indicated on the component drawing. The dimension and gagemaker's tolerance designated at the Go side of the gage to be made by the gagemaker is 1.7547 minus 0.0002 in.

The Not Go side of the inspection gage starts with the minimum component dimension of 1.750 in. No wear allowance is provided on the Not Go side of the inspection gage as the part seldom enters it, but the gagemaker's tolerance of 0.0002 in., shown on the chart, is applied in this case in a plus direction. This is in the direction of safety or within the tolerance shown on the component drawing. Therefore, the figure to which the gagemaker will make the Not Go side of the inspection gage is 1.7500 plus 0.0002 in.

An additional reason for not using a *wear allowance* on a Not Go gage is that a *wear allowance* would have to be outside the component limits which would be contrary to good manufacturing practice. It will be noted that the plus tolerance on the Not Go gage diminishes the metal for wear, while the minus tolerance on the Go gage adds metal to the wear allowance.

It should therefore be clear that the Go side of the inspection gage can be either 1.7457 in. or 1.7545 in., or any point in between to which the gagemaker may work. Since the maximum component dimension is 1.755 in., the gage can wear 0.0003 in. if the gagemaker has worked to the high side of his tolerance, or 0.0005 in. if he has worked to the low side, before the gage will exceed the maximum limits of the figure shown on the component drawing and pass a part which is incorrect. Fig. 2 shows the relationship of the tolerances on the inspection and work gages with respect to each other and the component tolerance.

The above illustrations have dwelt entirely on male component parts and female gages. However, it is clearly evident that by the application of the data contained in these tables to female parts and male gages, and by applying the data in the opposite direction (that is, plus to the Go gage and minus from the Not Go gage) satisfactory results are obtained, similar to those already alluded to.

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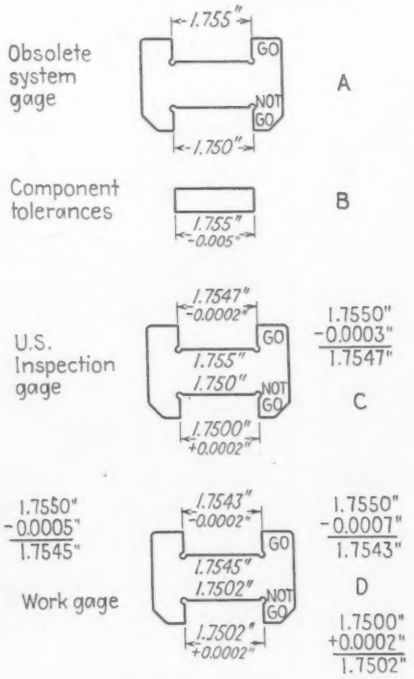
FIG. 1—Typical female gage dimensions worked out for inspection and work gages in line with the new system of Ordnance gaging. At A is shown a gage dimensioned under the old system.



Gage Laboratories

The arsenal gage laboratories are responsible for the initial checking and acceptance of all tools, jigs and fixtures used in the manufacture of war materiel, as well as all work

and inspection gages that are being procured in the present emergency. The largest and best of these laboratories are models which are copied by industry. The room is not only free from vibration, but is sealed, air-conditioned and also air filtered to prevent dust from affecting the accuracy of the instruments. The humidity of the air is controlled to prevent moisture from corroding the gages and instruments. The temperature of the air is maintained at 68 deg. F. and the temperature of all tools and gages to be measured must be brought to the same temperature as the precision instruments used to take the measurements, if accurate results are to be obtained. This practice applies especially for measuring long lengths. For example, a difference in temperature of 10 deg. F. in a steel gage measuring 47 in. long would result in an error of approximately 0.0003 in., based on a coefficient of expansion of 0.0000064 per deg. F. Precision gage blocks universally used in gage checking are kept here for important measurements only. They are periodically checked by the National Bureau of Standards. When checked by the Bureau of Standards, gage block measurements are based on their actual measurement instead of their nominal size. These precision gage blocks are the standard of all Ordnance gage laboratories and insure that Ordnance dimensional inspection is based on the United States legal standard of measurement. In the years prior to the emergency, through the foresight of the Ordnance Department, these laboratories were furnished with the finest measuring equipment obtainable, which include some foreign makes that have not been available since the start of the war.

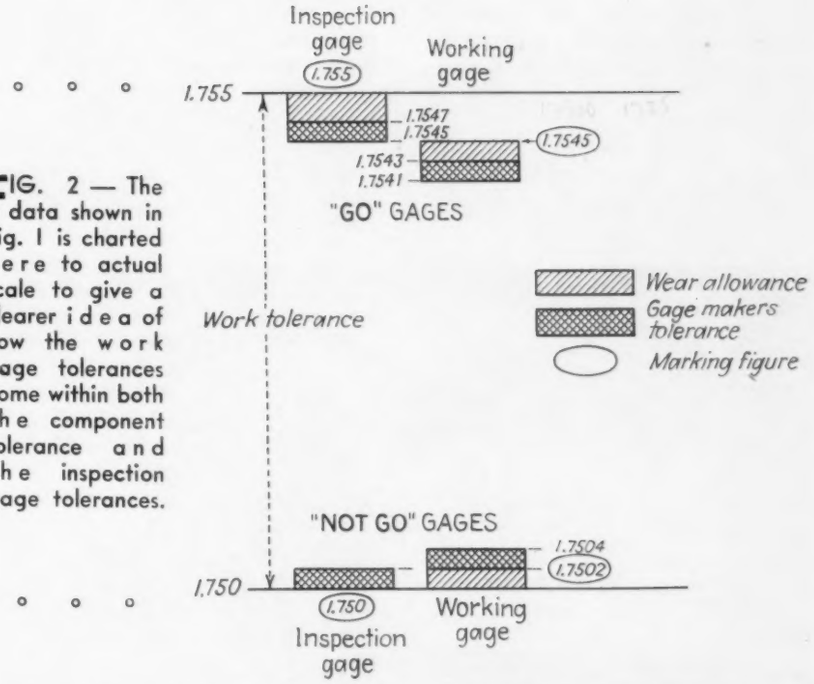


FIG. 2 — The data shown in Fig. 1 is charted here to actual scale to give a clearer idea of how the work gage tolerances come within both the component tolerance and the inspection gage tolerances.

Equipment

A list of the equipment in these laboratories includes the following facilities:

(a) A standard measuring machine provided with a vernier scale and microscope by which direct readings may be taken within 0.00001 in.

(b) A comparator using electrical means of amplification to indicate the inaccuracies of the piece being checked as compared to a master of known accuracy. Inaccuracies are indicated on a dial at a magnification of 10,000:1 so that 0.0001 in. on the work shows a movement of 1 in. by the hand across the dial.

(c) An optical projection comparator with magnifications ranging in steps from 12 to 100 diameters. This machine has a visual

FIG. 3 — Actual application of type of gages shown in Fig. 1 to artillery shell cases.

screen upon which the magnified image of the component is projected for accurate measuring or comparison with a magnified outline of the component.

(d) A universal measuring microscope for contour, coordinate or angular measurements which are taken by means of a cross hairline setting in comparison with one of the standard graduated glass scales magnified in each microscope, which are mounted on suitable adjustable cross slides. Results are read through two spiral micrometer microscopes with an accuracy of 0.00005. A circular table for rotating the work around a vertical axis and a dividing center for location around a horizontal axis are provided.

(e) One of the most accurate measuring facilities is the light wave measuring equipment, consisting of two semi-quartz optical flats or clear hard glass, neither having any magnifying power, which are very carefully ground and polished until one surface of each is perfectly flat to within .000002 in. In addition, it includes one set of master precision gage blocks, and a monochromatic light of one color and wave length similar to a neon light. This light wave equipment is ideal for checking flatness, parallelism and the size of small parts, and for detecting worn spots on the anvils of precision measuring devices, etc.

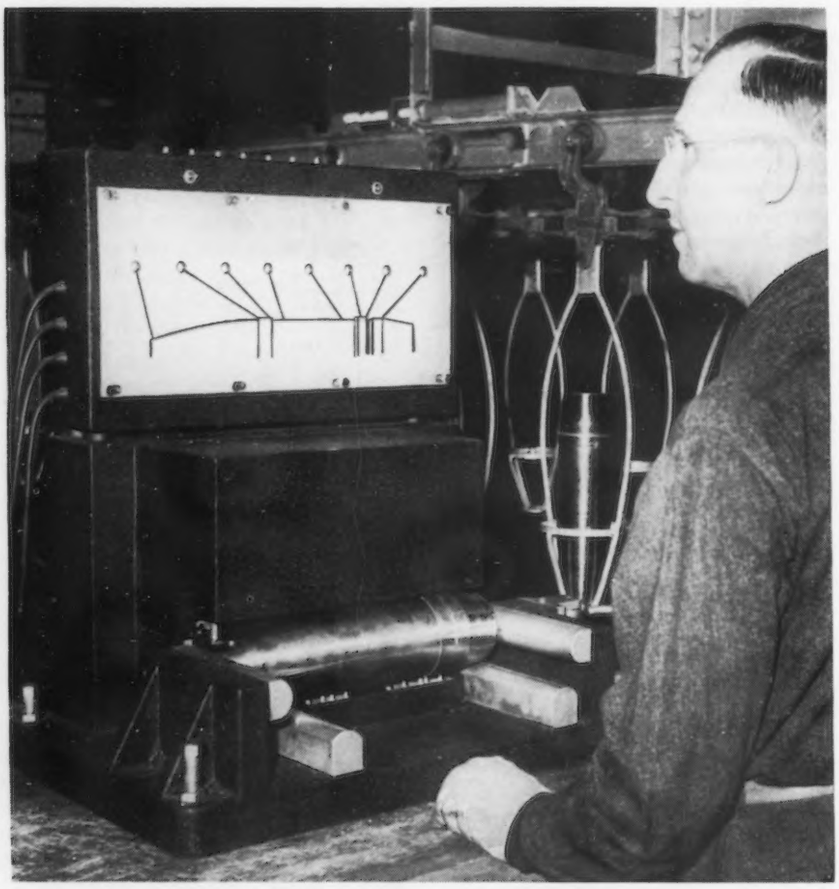


FIG. 4—This type of multiple contact electric gage not only reads as many as eight diameters or more at a glance in terms of over, under or on size, but also eliminates the necessity for setting up inspection gage tolerances and wear allowances.

When the optical flat is placed or wrung on to the work to be measured, interference bands of light and dark spaces will be visible through the flat, caused by the fact that the light reflected from the surface of the work interferes or is out of phase with the light reflected from the under surface of the flat. The dark bands indicate comparative vertical distances on the work, which is determined by the width and straightness of the bands, resulting in a definite measuring unit of 12½ millionths of an inch on the work per dark band, or eight bands to 0.0001 in. Straight bands indicate flat surfaces and curved bands may indicate convex or concaved surfaces. Interference bands seen with daylight are a series of colors similar to the colors of the rainbow.

The arsenal gage laboratories have other more commonly known measuring facilities which include toolmakers' microscopes, a vertical optimeter, a visual gage capable of 5000 magnifications, a Rockwell hardness tester, a Rockwell superficial hardness tester, and finally a large toolmaker's microscope.

New Types of Gages

A new instrument for gaging, recently developed under the guidance of the Ordnance Department, is known as the multiple purpose electric contact gage. Instead of routing a component part through a number of inspection stations, each gaging a different surface, the gaging of all these surfaces is performed by one instrument which gages all surfaces simultaneously. Flashing tell-tale lights indicate to the operator by their color whether or not the part will pass. If it does not pass, a warning light designates exactly which point or surface is at fault. A master light shows when all points are correct. This gage is a great time-saver and its use in industry is spreading rapidly. This type of gage is employed for shells, cartridge cases, primers, fuse components, etc. It checks simultaneously practically all external toleranced dimensions of components at an inspection rate that compares favorably with the highest production rates.

Pneumatic gaging devices for the internal dimensions of a certain type of fuse have been developed and procured for use at all facilities producing this fuse. Pneumatic devices for gaging gun bores have been developed and are now in use at arsenals and by inspectors at facilities producing small arms and cannon. Pneumatic gun bore gages permit faster and more accurate inspection than star gages and do not require highly skilled operators. A dial indicator gun bore gage has also been developed for cannon.

It is obvious from the foregoing that gaging history is being made in the Ordnance Department of the U. S. Army and is contributing mightily to our armament effort.

Armor Plate Planer Made of Structural Shapes

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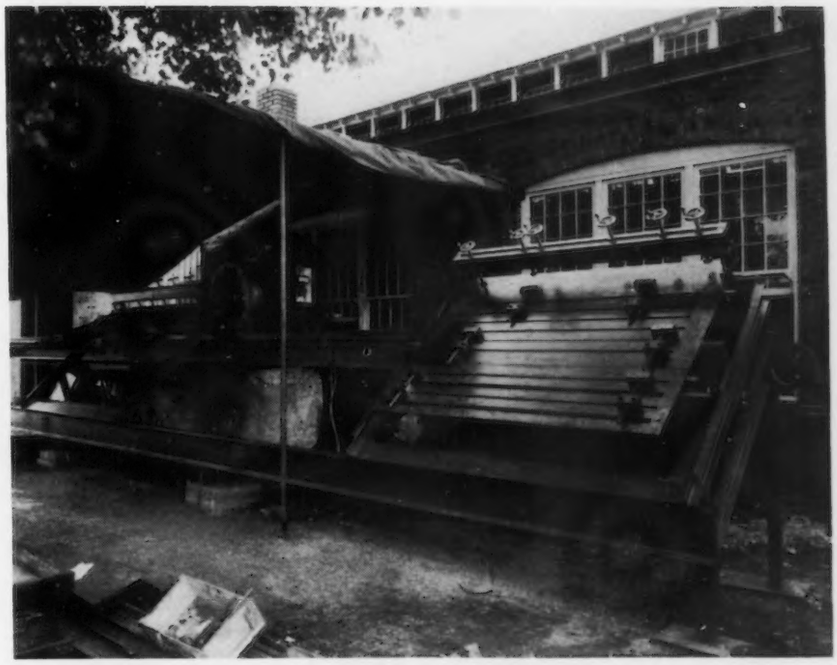
THROUGH the use of structural steel shapes and welded fabrications, the armor plate grinder pictured here was designed, built and shipped to a division of General Motors in less than 100 days. Weighing 25,000 lb., it used less than one-half the critical materials that might be needed for a machine of similar capacity but more conventional design. The machine is 45 ft. long and 12 ft. wide and is shown set up on a skeleton frame for test purposes. When actually installed, its I-beam track rails and grinder unit will be mounted on a concrete foundation.

The machine, which was built by the Vonnegut Moulder Corp., consists of a stationary grinder unit and twin traveling tables running on 45-ft. tracks. The machine is intended to bevel the edges of armor plate preparatory to arc welding into the shells of armored cars and combat tanks. Hence there is provision for adjusting the angularity of the tables by means of heavy screws so as to provide for edge bevels of 90 to 25 deg. While one table is unloaded, loaded and set up, the other table traverses the work past the grinding wheel.

Tables travel on ball bearing rollers upon hardened steel tracks set at an angle to resist grinding wheel forces. Feed is actuated by cable drive and can be varied from 25, 30 or 35 ft. per min. Each table is connected or disconnected from the cable by quick acting clamps.

The grinding wheel is a segmental type, 36 in. in diameter and is supported on a 6-in. diameter spindle in tapered babbitt bearings, with a ball bearing thrust collar. Drive is by eight V-belts from a 40-hp. motor. There is also a 1-hp. motor for driving the coolant pump.



MAKING the frame of this 45-ft. long armor plate edge grinder of welded structural steel saved much time in fabrication and reduced the weight of materials required.

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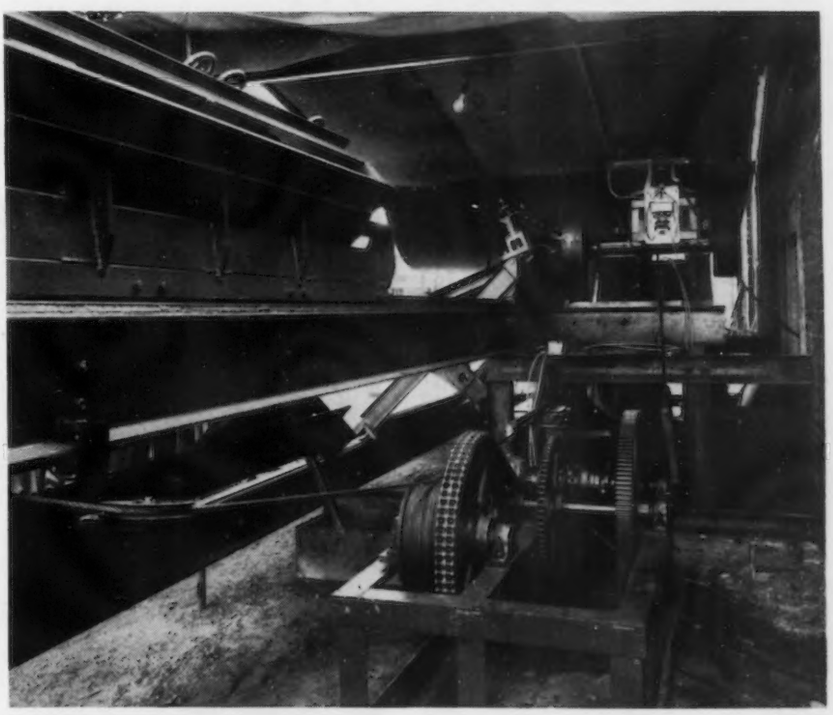

REAR view of the machine, showing the cable drive for the work tables. Cable power is supplied by a 3-hp. motor driving the cable drum through a pair of reversing friction clutches, reduction gears and roller chain sprockets.

School System Aids

By WALTER J. BROOKING
Director of Plant Education, R. G. LeTourneau, Inc., Peoria, Ill.

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ONE practical means of upgrading workmen is to provide for instruction of these men by their own foremen in evening classes held in the public schools, with the factory as a laboratory.

This plan is being very effectively used by the Peoria plant of R. G. LeTourneau, Inc., employing approximately 2000 men as arc welders, machinists, and in allied trades, to meet the company's increased requirements for trained men.

The part which the public school system of Peoria is playing is considerable. Approximately 20 months ago, the Federal Government set aside funds to be used by Federal, State, local, and privately endowed educational institutions for the purpose of war education. The idea back of this appropriation was that if there were some way in which the education of industrial workmen could be removed from the factory and placed in the already existing educational institutions, more effective use could be made of the production facilities already existing in factories.

A progressive vocational education program on the high school level was already in operation in the Peoria public school system. In cooperation with the local advisory board for National Defense Education, the Peoria school system set up night school classes in the industrial subjects which they were prepared to teach by virtue of equipment and facilities. These were opened to the general public on the basis of two 3-hr. class periods per week, the instructional material in which was supposed to supplement the work which the workmen who attended the classes were already doing. The cost of these courses was met by the Federal Government.

Because of the specialized nature of its work, and the relatively rapid growth of the R. G. LeTourneau organization in Peoria, the plant already had a well-developed system for the education of its employees on the job. This consisted of welders, machinists and allied workmen being trained from the start on the job. They started as regular employees of the company at full pay until they could perform the work required in the plant. Supplementing this on-the-job training was a program of home study courses based on the use of a text book and the answering of a series of questionnaires.

Employees were informed of the nature of these voluntary courses, their subject matter, and the length of time that would normally be required to do the studying and to answer the questionnaires. The questionnaires were made up, corrected and discussed by instructors closely allied with the actual work in the department. A large percentage of the workmen in the plant took these courses.

Quicker Education Needed

To fulfill the purpose of the national defense educational program in the public schools, a plan was envisioned to reduce the burden of education on industry and speed up the educational process. It discontinued the home study courses in the factory, placing them in public school classrooms where they were taught by foremen or supervisors from the factory.

During the summer months this plan was experimentally and cooperatively tried by the R. G. LeTourneau Co., and the Peoria public

SOME classes use no text books and meet in the shop for practical experience. This group is learning shop mechanical maintenance.

Industrial Training . . .

. . . A plan which ties in the facilities and supervisory experience of the public school system with the foreman and shop facilities of LeTourneau's Peoria plant speeds upgrading of war workers.

school system. Evening classes in machine tool operation, arc welding, flame cutting, and acetylene welding, blueprint reading, and shop mathematics were organized, based on the home-study texts and outlines, but expanded by teacher-student personal contact in the classrooms. They were held in one of the local high school buildings, three hours a night, two nights a week for 12 weeks. They covered the work which had previously been covered in from 30 to 52 weeks.

Qualified foremen and supervisors from the LeTourneau organization were examined and certified by the state board of education as teachers for the courses. When the home-study classes for LeTourneau employees were discontinued a careful program of plant publicity was undertaken to familiarize the workmen thoroughly with the new courses. Classes were open, not only to LeTourneau employees, but to anyone in the Peoria area who was engaged in similar work.

Each course was administered by the Peoria Board of Education, whose director of vocational education was assisted by the director of plant education in the LeTourneau plant.

Good Response to New Courses

The response to these experimental classes was very good. First, it was found that there was a wide interest in the subjects presented, both on the part of the men in the LeTourneau plant, and by men working in other plants in the community. All classes were set up on the theoretical or semi-theoretical basis because those who attended were already working in the field being studied and it was thought that they could correlate six hours of theory a week in that subject to considerable advantage. This automatically limited the course to men who were already doing the type of work being studied; and therefore became strictly a supplementary, upgrading class.

The workmen did not seem to be reluctant to come to a school building to study the theoretical side of their daily work. The attendance was quite regular from class to class, and it was found that about 60 per cent, a rather creditable percentage, of those who started a course continued to its completion. The number of men enrolled in each class varied from 15 to 30, though 20 was looked upon as the ideal class for most work. The attitude of the men attending these classes towards the school building, its equipment and grounds was very good.

From a purely administrative point of view, the courses tried in the classrooms in the local high school during the summer months could have been set up and conducted on factory premises. They could have been administered through the Peoria public school system but the contribution of the local school board in allowing the use of the school building itself for these courses was one of considerable importance. If classrooms were not already available in a plant, the setting aside of a space large enough for one or several classrooms in the average industrial

EACH man in this class spends three hours a week on the lathes in the high school machine shop, and three hours in theoretical study with a text book.

plant might be very difficult, or even impossible. Further, the problem of getting blackboards, desks, or chairs and tables, and other fixtures suitable for a classroom; the arranging for lighting, drinking water, and toilet facilities which must be adequate for classes of from two to three hours duration would be one of considerable magnitude for the average plant. In the interest of speed of getting the classes started and economy in their completion, the use of already existing schooling facilities was obviously the most effective solution to the space and furnishing problems.

The fact that they were made available on this cooperative basis was a considerable contribution to the present vital educational effort.

The experimental classes held in the summer were so successful that a somewhat expanded program was undertaken for the fall months, October through December. In addition to the regular classes which were being taught under the war program in the local high school the following classes were set up; taught by supervisors and foremen from the LeTourneau company, and open to the attendance of LeTourneau employees, and any other employee in the Peoria vicinity who was interested, as far as the capacity of the class could accommodate them:

Two classes in machine tool operation.

Two classes in blueprint reading.

One class in elementary shop mathematics.

Four classes in theory of arc welding and arc welding control by symbols.

One class in flame cutting and acetylene welding.

One class in elements of inspection.

Two classes in first aid and factory safety.

One class in heat treating.

One class in time study for foremen and supervisors.

Of the 15, five were set up on the premises of the LeTourneau plant, and given in the afternoons from 2 to 5, two days a week for the benefit of the men on the night shift. All of these classes were well attended.

Observations

There were over 15,000 hours of actual classroom study completed voluntarily on their own time by employees engaged in defense industries. The amount of theory which they can absorb in a theoretical or a semi-theoretical class, along with their daily work, allows them to correlate what they know and increase vastly their effectiveness and adaptability on the job. Such training and upgrading is of fundamental importance at the present time when personnel in many plants is in a state of flux due to military service absorbing men, and new types of work being brought into factories.

HIGH school drawing desks and blackboards contribute materially to the effectiveness of this class in blueprint reading.

It has been found that members of a class which goes from the classroom into the plant to examine certain phases of the subject or to study how their department is related to other departments, often develop a very desirable interest in their job as a whole. It is apparent that 10 or 12 weeks in such a class is vastly superior in effective learning value to any home study course taken by the average man. A classroom course, taught by a man who is supervising the type of work under discussion gives the workman an opportunity to ask many question concerning the work which he normally may not be able to ask in his daily work.

Foremen or supervisors teaching such classes frequently find qualities and capacities in men which they may not have recognized in their daily contact with them. The men in these classes come to know the supervisor as a workman and also as a teacher and human being. This has great advantages in the building up of an understanding and cooperative personnel within a plant. Men from other plants than the one from which the teaching foreman and perhaps the majority of the class come, bring their contribution in new ideas and discussion because of varied experience, and profit by the exposure to new ideas and different ways of doing things.

The instructor of these classes probably learns more than anyone else in his class. The fact that he is formally placed in charge of a group of men and vested with the responsibility of teaching them the finer points and the broader aspects of the job which they are doing, usually requires him to do some studying which he might not otherwise do; and which he probably always intended to do if he could get to it. The fact that his relation to the course is that of a paid instructor also may motivate him to do a more conscientious and thorough job. The experience of conducting a class contributes noticeably to the self-assurance, self-confidence, self-esteem, and effectiveness of most of the instructors, not only as teachers of such courses, but on their regular jobs. For this reason, a plan is being carried out as far as is possible to pass the experience of teaching such classes from one supervisor to another at the end of the second three months' teaching period.

Such classes as these must be kept on a strictly practical basis. The text books (which are purchased by R. G. LeTourneau, Inc.) play a varying part in each course, depending upon its nature. In most of these classes a text book is looked upon as a general outline upon which the practice of the plant may be super-imposed; with which the knowledge of the people in the class may be correlated. The heat treating class, for example, uses a text book which is rather wide in its scope because the LeTourneau plant builds all of its own furnaces. Therefore, a study of refractories, furnace construction, pyrometry, steels of different kinds, different heat treating processes and some elementary considerations of metallurgy rightfully find their place in the course. All study is done during class time—there is no home study in any of the courses. Text books for blueprint reading and for shop mathematics are rather standard because these two subjects are elementary to almost any kind of shop work, and have, therefore, been rather carefully studied in the past.

Examinations are not given very often, nor is there much emphasis upon the grading of the men in the course from day to day, although at the end of the course there is a grade assigned to each man based on his accomplishments in class and his faithfulness of attendance. Both the examinations and the grading are considered to be of secondary importance. The essential thing in these courses is to have men attend the class who, by virtue of being in the class, go back to their daily work better workmen. To be able to write a good examination may not indicate that the man will go back to his job and apply what he has learned. Therefore, the emphasis is laid upon presentation of material, correlation of it with daily work in the plant, and continual service from the instructor to the man in the class on his own ground. The degree to which the man goes back to the plant and applies what he learns is the only valid criterion by which these courses may be evaluated.

This cooperative method wherein the public school system contributes its supervisory experience and its classrooms, blackboards and other equipment for the purpose of industrial education; where industry supplies the teacher, the organized subject matter, and offers its plant as a laboratory for inspection, demonstration or some actual work; and where industrial workmen may come to study, free of charge, the work which they are doing from regular factory foremen and can do all their studying in the classroom in a concentrated 12-week course of study effectively takes much of the burden of factory training off the shoulders of industry. It is an exceedingly important contribution to the war program.

Electronic Controls Guard Furnace Atmospheres

A SPECIAL tube, providing a continuous check on the purity of the hydrogen gas flowing over steel in atmosphere furnaces, has been developed by Westinghouse electronic research engineers. Such control is especially important where the dew point of the treating gas must be maintained in the critical region of —40 to —94 deg. F. for precise furnace conditions such as required for bright annealing, or for chemical processes using purified dry hydrogen or similar controlled gases.

Steel is often heated in an atmosphere of highly purified hydrogen that is practically free of moisture and oxygen. Ordinarily, to measure moisture in the gas where dew points are less than 32 deg. F., a cooled and polished metal plate is inserted in the gas stream and the temperature noted when condensation first occurs. However, below —40 deg. F., this method becomes largely guess work and even skilled testers disagree on the values of the same gas. This new electronic method insures reliable and accurate determinations of the moisture and oxygen content in hydrogen or disassociated ammonia gas.

In operation, the gas flows through a two-element tube, shown in Fig. 1, containing a tungsten filament and plate. The wiring diagram for the control is shown in Fig. 2. Electrons flying from the hot filament to the plate continually bombard the gas. If the gas is pure dry hydrogen, all electrons reach the plate; but any oxygen or water vapor in the gas immediately pick up some of the electrons and form negative ions, thereby reducing the electron current. This change of current in the plate circuit indicates the degree of impurity in the gas.

FIG. 1—A continuous sample of the hydrogen gas used in atmospheric heat treating furnaces flows in the top of this tube and out the base. If moisture or oxygen is mixed in the gas, the tube passes less current, and the current volume passing through the tube measures the gas purity.

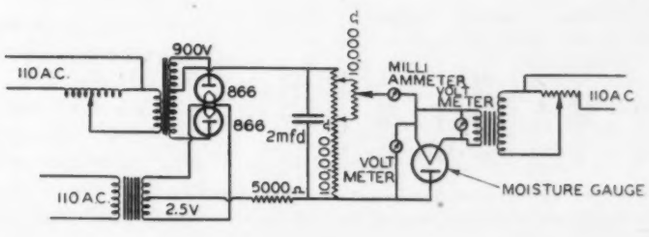

FIG. 2—This is a simplified schematic wiring diagram of the dew point electronic control apparatus.

Hardenability of Steel

By A. E. FOCKE
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. . . In concluding this series of three articles, in which the concepts involved in measuring hardenability and the test methods employed have been outlined, the author correlates the test data and gives a practical example of its application in choosing a substitute steel.

FOR the standard Jominy test bar the cooling rate in terms of distance from the water quenched end is shown in Fig. 25. The "L" bar curve shown on this chart, used primarily for shallow hardening steels, is discussed below.

From this chart it is possible to plot hardness-cooling rate curves (H-CR Curves), as shown in Fig. 26. Usually the cooling rate is plotted logarithmically in order to cover the entire range. The SAE in its proposed standard suggests a form such as shown in Fig. 27 which automatically provides the correlation between distance from the water quenched end and cooling rate, and also the pertinent data on the steel and test procedure. The writer has revised the standard form slightly to include columns for recording the pretreatment and the D_1 values. Then with a set of curves such as shown in Fig. 28 it is possible to develop the hardness-traverse (U) curves. From these U curves, or more directly from a chart such as shown in Fig. 29, it is possible to transpose Jominy end quench data into ideal critical size D_1 or vice versa.

For example, using the data in the U curves of Figs. 11 and 12 and the curves in Fig. 28, the Rockwell C hardness-cooling rate curve for 3140 steel can be developed as shown in Table VI.

TABLE VI
Rockwell C Hardness Cooling Rate Chart for SAE 3140 Steel

Diameter Test Piece, In.	Quench	Cooling Rate from Fig. 28			Rockwell Hardness From Fig. 11 or 12		
		Surface	Midway	Center	Surface	Midway	Center
1	Oil	120	52	45	54	53	52
2	Oil	60	24	18	50	34	34
2	Water	700	45	32	59	52	47
3	Oil	30	11	9	47	32	32
3	Water	500	28	8	59	45	32

These are the data plotted for 3140 in the upper curves of Figs. 24, 26 and 27, but all the 1045 information on these three figures was obtained from actual Jominy end quench tests. The D_1 values from the Jominy information were obtained by using the chart shown in Fig. 29 and the calculated D_1 values were obtained by the Grossmann method[4], using a nominal analysis for the 3140 but actual values for the 1045.

Finally, to return to the first example of the 3140 part for which 1045 was to be substituted, it is possible by using this information to predict not only whether or not the 1045 would show satisfactory surface hardness but also within reasonable accuracy just what the hardness would be on the surface and at any point within the part.

Also, by comparing the hardness distribution obtained on the actual quench with that obtained on equivalent rounds or flats it is possible with fair accuracy to determine the surface hardness and distribution across the section which would be expected if a more drastic quench were utilized.

On the gear which was chosen as an example for the first part of this article, it was stated that the surface hardness as ordinarily quenched was only 48 when the gear was made of 3140. From Fig. 27, it is clear that a hardness of 48 on 3140 was obtained at a cool-

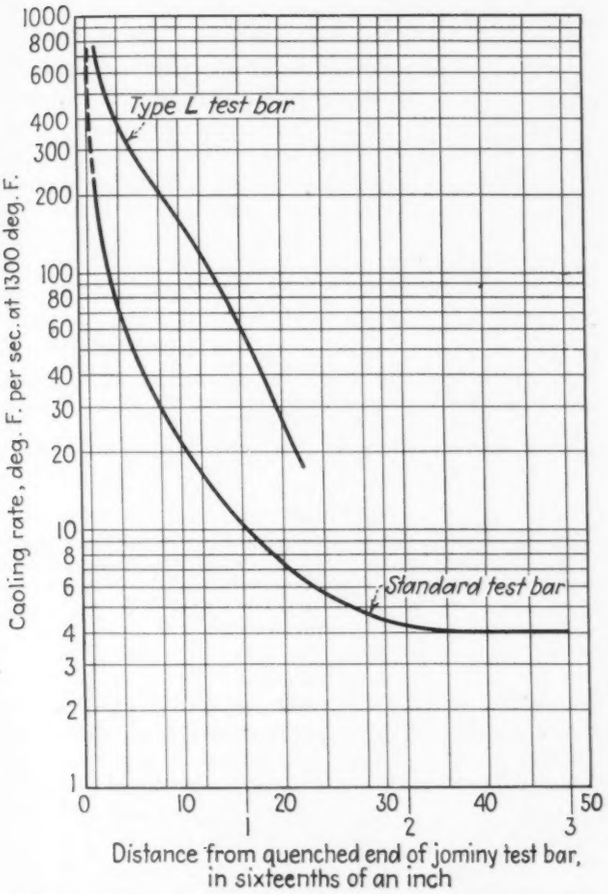

Type L test bar
Standard test bar
Cooling rate, deg. F. per sec. at 1300 deg. F.
Distance from quenched end of jominy test bar, in sixteenths of an inch

FIG. 25—Cooling rates determined experimentally for standard Jominy test bars.

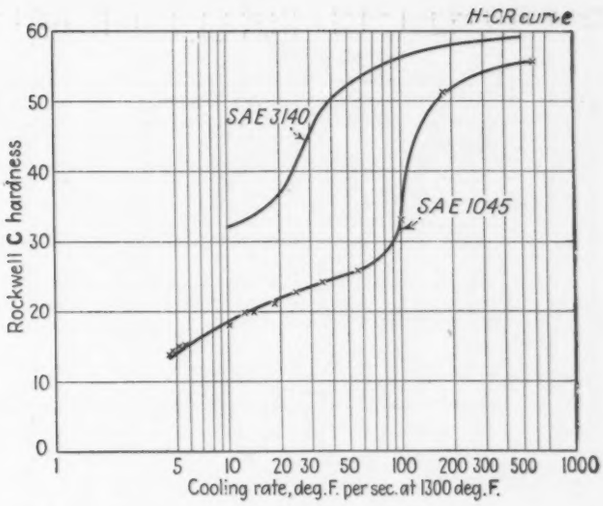
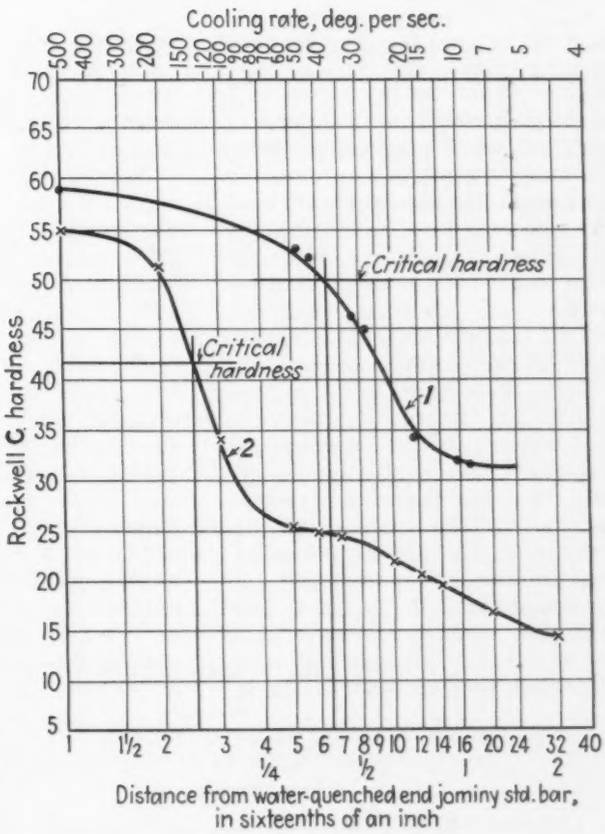


FIG. 26—Hardness - cooling rate curves based on Figs. 24 and 25.



RIGHT

FIG. 27 — Data from Fig. 26 plotted on a modification of the SAE proposed standard form which provides a correlation between the distance from the water quenched end and the cooling rate and also gives data on the steel and test procedure.

ing rate of about 30 deg. F. per sec., and it is obvious that this same cooling rate would only develop about Rockwell C 24 in 1045. From Fig. 28 a cooling rate of 30 deg. F. per sec. would be obtained in oil on the surface of a three-inch round, and for purposes of approximation then it would be possible to consider the gear to be the equivalent of a three-inch round so that if a water quench had been used, the surface cooling rate could be expected to be about 400 deg. F. per sec., which would have been more than sufficient to provide a hardness on the surface of 1045 in excess of the 45 Rockwell C required.

But, assuming that a cross section of the 3140 gear showed a minimum hardness of 32 and it was felt that it would be necessary to keep this value above 30. From Fig. 27 again this would correspond to a cooling rate of about 7 deg. F. per sec., so that 1045 similarly quenched would only show about 17 Rockwell C. Again

SAE No.	Hard Test No.	Chemical Analysis								Pretreat	Quench Temp., Deg. F.	Grain Size	D_1	Calc. D_1
		C	Mn	P	S	Si	Ni	Cr	Mo					
3140	1	0.40	0.65	0.015	0.017	0.15	1.25	0.62	.....	1600I A	1500	5	2.58	2.55
1045	2	0.42	0.74	0.012	0.025	0.12	.....	0.15	.....	H. R.	1500	4	1.50	1.50

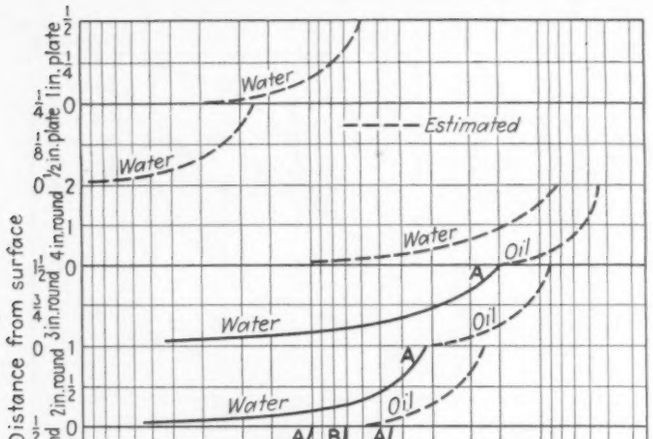


FIG. 28—Chart for using hardness-cooling rate curves to predict the actual hardness which would be obtained on various size rounds when oil or water quenched. Curve A is based on Scott[13], B is by Asimow, Craig, and Grossmann[16] and C is from French and Hamil[22].

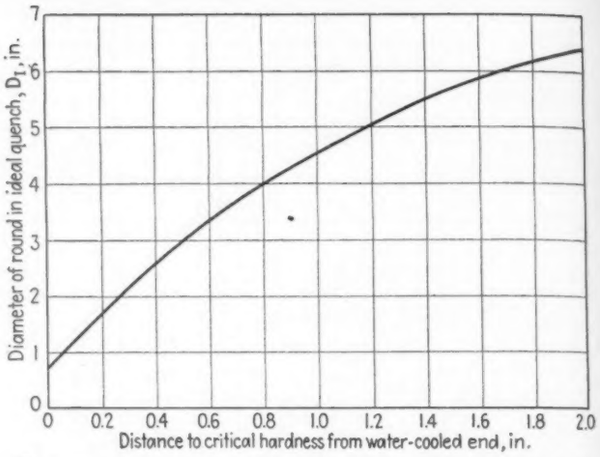


FIG. 29—Jominy end quench data can be transposed into ideal critical size D_I or vice versa, by means of this chart (Grossmann).

it could be seen that the gear had cooling rates similar to those which would be developed in a three-inch round, so that even if the 1045 were quenched in water to satisfy the surface hardness requirement, the minimum core cooling rate would not be over 15 deg. F. per sec., so that the core hardness would be only about 20 Rockwell C.

For shallow hardening steels such as the 1045 described, the "L" bar shown in Fig. 30 may be substituted. Because of its shape, the faster rates of cooling are stretched over a greater length and provide, therefore, greater sensitivity. The cooling rate-distance from the end of the specimen for this L bar are shown in the upper curve of Fig. 25. If data are taken on an L bar, care must be exercised to prevent confusion in transposing to other units by keeping everything directly in terms of cooling rates and not depending upon transposition charts such as Fig. 27, which are prepared for the standard bar.

For small sections from which it would not be possible to prepare the standard Jominy test piece, the SAE recommendation includes a variation of the standard water orifice and pressure heights as shown in Table VII.

The hardness along such smaller bars could be plotted against the distance from the end and used for comparisons between treatments or heats, but the increased effect of air cooling on the smaller diameters will change the shape of the cooling rate-distance from quenched end curve to such an extent that the results should not be recorded or used in terms of the cooling rate. If such cooling rate information is necessary, then a shell, such as shown in Fig. 31, must be prepared and heated to about 212 deg. F. The recess is filled with Wood's metal containing 50 per cent bismuth, 25 per cent lead, and 25 per cent tin, the sample forced into place, the upper stud screwed in and the shell and piece treated in the usual manner. After quenching the shell, it is again warmed in boiling water to remove the test piece. It is probable that if enough samples of the same stock are treated both in the shell and as sub-diameter test pieces, it would be possible to work out from the hardness relationship the cooling rate distance from water quenched end curves, so that additional materials could be compared without the necessity of following the shell procedure. In the writer's laboratory a modification of this shell procedure is being used to test the hardenability of strip steel.

TABLE VII
SAE Recommended Water Orifices and Pressure Heights for Hardness Tests on Small Samples

Bar Diameter, In.	Orifice Size, In.	Distance from Orifice to Quenched End of Sample, In.	Free Height of Water Column, In.
3/4	1/2	1/2	2 1/2
1/2	1/4	3/8	4
1/4	1/8	1/4	8

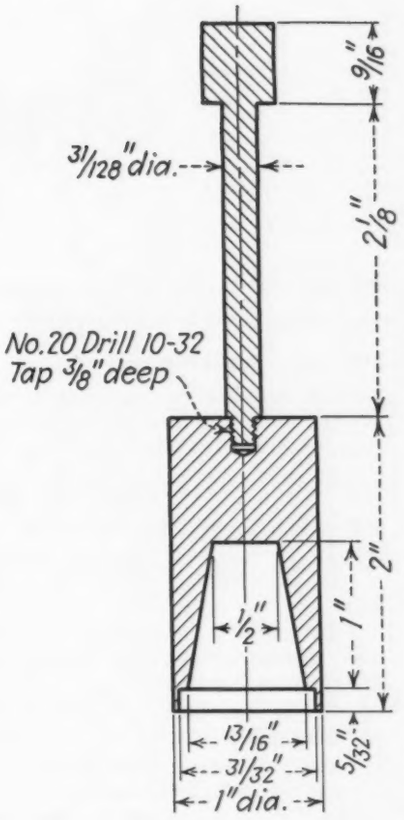
General Application

The Jominy hardenability test has already been applied to such widely diversified products as Meehanite cast iron and shell steels[20]. Tests on heats with chemistry well within the specified limits show wide variations in Jominy results. Actual production runs prove that shells from heats which show low hardenability on the Jominy test will be too soft after a standard heat treatment; while those which show very high hardenability in this test will crack in production.

The test has also been recommended as a means of assuring satisfactory hardening without cracking in selective hardening by induction or flame. Specimens may be carburized and the H-CR curves established for both the case and the core. This makes it possible to predict not only whether the case will be suitably hardened, but also whether the core will be satisfactory, because in many cases the core hardness must be high to prevent cracking of the case, while for other parts which are to be selectively carburized by copper-plating, the plated areas must not harden so high that machining will be too difficult. In a similar way, it is now being used to determine the probable reaction of a steel to welding.

Jominy data are already being used by steel producers to show the characteristics of new steels[21], and now that the method has won the approval of the SAE, it may be expected that more and more information will be available from the mills until it will be as common to expect them to furnish Jominy data as it now is to expect that the chemical analysis will be supplied.

It is certainly clear that modern developments in hardenability testing procedures and applications will assist materially to establish the heat treatment of steel as an exact science.



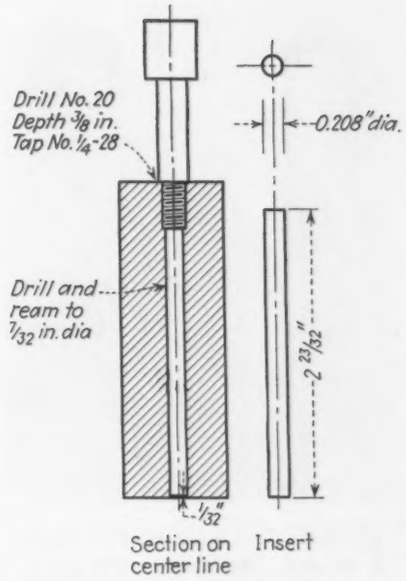


FIG. 31—A drilled bar for steel which is available only in small sizes.

LEFT

FIG. 30—Greater sensitivity is provided in testing shallow hardening steels by the use of this "L" bar.

Bibliography

[19] "Jominy Test for Meehanite," A. C. Denison, THE IRON AGE, April 24, 1941, p. 41.

[20] "Recommended Steel Specifications for Use in the Manufacture of Armor Piercing Shot to be Hardened on Tocco Equipment," Ohio Crankshaft Co., January, 1942.

[21] "Properties and Characteristics of NAX 9100 Series Steels," Technical Publication, Great Lakes Steel Corp., Detroit, 1941.
"Possible Alternates for Nickel, Chromium and Chromium - Nickel Constructional Alloy Steels," Bulletin No. 5 Contributions to the Metallurgy of Steel, A.I.S.I., January, 1942.

[22] *Transactions*, A.S.S.T., Vol. 16, 1929, P. 711-739.

Scaling of Heat-Resistant Steels and Alloys

TWO fundamentally different types of scale may be formed on heat-resistant steels, according to a paper by G. Bandel in a recent issue of *Archiv fur das Eisenhuttenwesen*. These scales are: (1) That consisting of the oxide of the effective alloy components, that is, the component which oxidizes most readily; and (2) scale consisting of iron oxides. Occasionally, on the same specimen, both types of scale are found.

A layer of the alloy scale forms an effective protection against further scaling, while the iron oxide scale has little protective value at temperatures over 1022 deg. F., owing to the permeability of iron oxides to oxygen at higher temperatures. A protective layer of scale can be formed only if there is a primary layer with high iron oxide content above it, and its formation is greatly affected by the alloy composition, the temperature, and the surrounding medium. Further, the presence of mill-scale and casting skins may interfere with the development of the protective scale.

Numerous cases are discussed which may lead to the destruction of a protective scale layer, especially the secondary local formation of scale rich in iron oxides, the scaling loss at edges and corners, external mechanical and chemical effects, the presence of inclusions in the material and the oxidation of certain alloy components, such as boron, vanadium, tungsten, and molybdenum.

Local scale formation of chromium-nickel steels exposed to sulphur-containing gases is discussed, and it is shown that the attack is particularly severe if crusts, for example, of lime are formed on the steel. Sulphur will be accumulated in these and act as a sulphide. The relation between the orientations of the crystals of the steel and those of the scale is also considered.

Cupola Practice

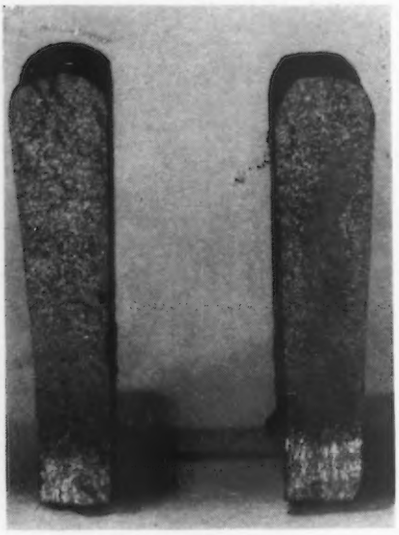


FIG. 5—Test block to show depth of chill. The chill on the left is satisfactory, while the right hand block shows a high carbon streak in the center which is not desirable.

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IN order to give a clear picture of the use of briquettes, it is necessary to go into some detail regarding the cupola setup at Allis-Chalmers. There are three different cupola units there. A three cupola unit in No. 2 foundry, and a three cupola unit in No. 1 East, which are used for production melting and are charged by units of the Whiting type. No. 1 West is also a three unit cupola setup using a skip with boxes, each cupola having its own track and hoist.

No. 2 foundry is a production foundry running mostly on light work weighing up to 250 lb. There are two units each having two lines and some floor work. This foundry will average from 40,000 to 50,000 castings per day when running at normal capacity. These castings vary from a few ounces to 90 lb. on one unit and from 50 to 250 lb. on the other.

The first line, known as No. 1 or the 32-man mechanized unit, carries the cylinder liners of sleeves, of which one pattern setup will turn out over 1600 castings per 8 hr. Anyone familiar with liners or sleeves recognizes these castings as difficult to make and prone to high scrap losses, yet this line is able to turn out several thousand per day with a total foundry and machine shop scrap under 3 per cent.

Irons Melted

Each unit has two pouring lines, one for soft iron and the other for base iron. The soft iron is used for all jobs where the specification calls for A.S.T.M. 48-36 class 20, and, while it will run higher than this by 5000 lb. per sq. in. or more, it has been found suitable for the jobs.

This foundry operates on a base iron melted in cupolas having a Whiting charging system. This system is operated by three men and is capable of 40 tons an hour. There are three cupolas, two 66-in. and one 54-in. inside diameter. Regardless of the number of cupolas run, as determined by production demands, the same charge is used. This charge is made up as follows:

15% pig iron
10% bundles and flashings (salvage materials)
20% steel briquettes
17% cast iron briquettes
38% cast iron scrap, sprues, gates and remelt

The silicon and manganese balance is maintained by the use of purchased briquettes of these materials. A chill depth of ¼ in. is maintained on the test block, as shown in Fig. 5, and is controlled by using SMZ alloy No. 2.

The chill on the left in Fig. 5 is desirable and has been inoculated with the SMZ alloy. The chill on the right, however, though deeper, is undesirable since it has the high carbon streak in the middle. This iron would not be used for liners or heads but would be inoculated for soft iron. This type of background is never found when operating at constant rates without shutdowns. The charge listed above has been used for many months without any major change; only the amount of silicon or manganese briquettes are changed as variations occur in the analysis.

The charge is changed only as the total carbon changes. When the T.C. changes, the pig iron is raised or lowered and the cast iron scrap correspondingly altered so as to maintain a 3000 lb. charge. The steel remains constant as our supply is sufficient to maintain a 30 per cent content.

This base iron is used "as is" for the line on which the liners are cast, inoculated with 4 lb. of SMZ No. 2 alloy and 2 lb. of Mexican graphite per 1000 lb. for the two soft iron lines, and with 0.75 per cent V-5 or 1.5 per cent copper for the fourth line. This fourth line carries the heads, brakedrums and heavy flywheels. A chill test is poured from each ladle of iron so that the inoculation can be adjusted to obtain the desired result.

Base Iron Analysis

The analysis of this base iron will run, and is maintained, at the following figures:

Total carbon	3.25 to 3.35%
Silicon (maintained by Si and Mn briquettes)	1.85 to 2.00%
Manganese (maintained by Si and Mn briquettes)	0.85 to 1.00%
Phosphorus	0.10 to 0.16%
Tensile strength	35,000 lb. per sq. in. on a 1.20 bar
Brinell hardness:	
Liners (maintained by SMZ No. 2)	245 to 265
Heads (maintained by V-5)	229 to 247
Brakedrums (maintained by V-5)	207 to 229
Flywheels (maintained by V-5)	207 to 235

These critical jobs must meet these Brinell limits.

All the castings are machined on production lines and each ton of liner iron, which is equal to one ladle, is checked for Brinell hardness. This No. 2 foundry, while producing between 40,000 and 50,000 castings per day, has an overall machine shop and foundry scrap of under 5 per cent with an average yield of 71 per cent, figured on the basis of good castings shipped. The production of this foundry is not from only a few patterns. Practically all the small castings for the Allis-Chalmers' products, which are many and diversified, are made in this foundry.

There are seven molders on specialties averaging probably close to 20 different patterns each per

with Briquettes . . .

By W. A. HAMBLEY and KENNETH GEIST
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. . . In this, the second and concluding article by the authors on briquetting, the use of briquettes for the various base irons required by Allis-Chalmers, inoculation technique, spout temperatures and savings realized by briquetting borings and turnings are discussed. The use of baled silicon sheets as a source of low-carbon silicon is also described. The first article of this series was published last week.

day, or in a month's time an average of 3000 different patterns. There are less than 25 patterns that require a daily production, less than 50 that have to be run at least every third day and yet there are between 40,000 and 50,000 castings produced daily. These figures are inserted to give a clearer picture of the problems in No. 2 foundry.

Previously it was stated that all the steel in most mixtures was steel briquettes. However, in No. 2 foundry the charge contains bundles and flashings. The flashings are salvaged from the forge shop and the bundles are baled clippings from electrical work. In order to get a bundle that will remain firm and compact, two-thirds electrical silicon sheet steel is baled with one-third black sheet clippings. These are used for economical reasons because the selling price is too low for the returns we are able to get from them.

Use Baled Silicon Sheets

The silicon sheets furnish a low carbon source of silicon and, as the recovery is high, it is more economical to use them than to sell them. Fig. 6 illustrates how these bundles melt in a charge. This one was removed from the melting zone for examination.

No. 1 East production melting unit furnishes iron for the heavier tractor castings, mainly cylinder blocks, transmissions, torque tubes, housings and wheel weights and texrope sheaves. This iron is essentially the same as the base in No. 2 foundry.

One base iron is melted in a 66-in. cupola and used for all jobs in No. 1 foundry for which it is suitable. It is inoculated with the same amounts of SMZ No. 2 and carbon raiser for soft irons, as in No. 2 foundry. The charge consists of: 10 per cent pig iron; 20 per cent steel briquettes and heavy chips; 10 per cent bundles; 16.6 per cent cast iron briquettes; 43.4 per cent cast iron scrap, returns, etc.

The silicon and manganese balance is maintained with briquettes of these materials. The analysis of this iron will run:

Total carbon (maintained by pig iron)	3.20 to 3.30%
Silicon	2.10 to 2.30%
Manganese	0.85 to 1.00%
Phosphorus	0.18% maximum
Tensile strength	30,000 lb. per sq. in. on 1.20 bar

The Brinell hardness on the texrope sheaves is maintained at 170 minimum and 227 maximum by V-5. This hardness varies with the sections. The cylinder blocks and the other castings from the inoculated irons will Brinell around 200 while the tensile strength of this iron will run around 27,000 lb. per sq. in. on a 1.20 bar. This cupola unit produces about 100 tons of iron a day and its rate of production will vary from 18 tons an hr. to as low as 8 tons an hr. In spite of the variations in the melting rate, the analysis will remain constant.

This cupola setup, equipped with Allis-Chalmers' blowers and Foxboro controls, will produce iron with a variation of less than 10 points in total carbon and 15 points in silicon during an 8-hr. run. This is also true of No. 2 foundry unit, which will produce 150 tons a day with the same consistent analysis.

FIG. 6—Baled silicon sheet taken from the cupola to show how it melts.

These results have been inspected by a representative of THE IRON AGE who expressed the opinion that truly briquetted materials will produce consistent analysis and results.

No. 1 West cupola unit, which is operated for the different classes of work for the many Allis-Chalmers' products, is more or less a jobbing type foundry. The average melt over the year is 100 tons a day, yet on some days it is necessary to pour one casting weighing this amount alone, and at times it is necessary to run all three cupolas. There is one 72 in., one 66 in., and one 54 in. cupola in this setup, all operated with Foxboro controls and A-C blowers.

These cupolas melt for about 5 hr. a day and produce irons over the whole range of A.S.T.M. 48-36, Classes 20 to 60. The class 50 and 60 irons are run from the 54-in. cupola when the tonnage demanded is in small ladles of 7000 lb. and under, but when a casting weighing some 50 tons demands this iron it is run from the two larger cupolas.

High Test Mixture

This mixture is made up in 3000 lb. charges as follows:

85 per cent briquettes
10 per cent high test iron scrap and returns
5 per cent high phosphorus pig iron

Silicon and manganese balance is maintained with briquettes. This iron is melted with 2.0 per cent silicon content and is inoculated with 40 points of silicon by SMZ alloy No. 2. When this iron is to be used in castings with sections of 1 in. or under, it was customary in the past to use 1 per cent nickel to aid machinability. This was later changed to 1.25 per cent copper, which is not available now, although whatever scrap materials as was salvaged, such as monel or everbright or copper, was used to maintain a minimum of 1.25 per cent of copper, nickel or both.

However, the same results can probably be obtained by other methods. This is really a beautiful iron, if such can be said of iron, since the Brinell hardness remains constant across a 6-in. section.

80,000 lb. Tensile

A copper-molybdenum-chromium combination has produced tensile strengths of over 80,000 lb. per sq. in. with high impact values. The final analysis of these irons run:

Total carbon	2.65 to 2.90 per cent
Silicon	2.40 to 2.70 per cent
Manganese	1.25 per cent minimum
Phosphorus	0.10 per cent

As stated previously, alloys used depend on the casting use and section. Many castings weighing 50 tons have been produced with this metal without any alloy additions other than the SMZ.

Covering the range of the different classes of iron, Class 40 is made from charges having:

40 per cent steel briquettes
30 per cent cast iron briquettes
10 per cent cast iron scrap
20 per cent pig iron

For Class 30 the following charge is used:

20 per cent steel briquettes
25 per cent cast iron briquettes
25 per cent pig iron
30 per cent returns

The Class 20 iron will have only 10 per cent steel briquettes and 30 per cent cast briquettes. The silicon content of the above irons will vary from 1.25 to 2.50 per cent, while total carbon will vary from 3.25 to 3.50 per cent depending on the class. This foundry which is part jobbing and part production, has consistently run under 3 per cent total foundry and machine shop scrap.

This is only part of the picture of No. 1 West, as there are many other melting problems such as hard iron for chilled iron castings as wearing plates, rolls, and crusher parts, and iron for rotors which are solid chunks up to 24 in. in diameter and 5 to 8 ft. in length in which the hardness and strength must be maintained even in the center. This foundry has an average yield, based on good castings shipped, of 73 per cent.

Industry is facing today only a brief outline of Allis-Chalmers' practice in the use of salvaged materials in briquette form, but it may help answer some of the many questions which the foundry industry is facing today. The melting loss when using these materials, as far as can be figured, is no more than for any other scrap.

All materials charged into the cupola are weighed with a fair degree of accuracy and all the castings leaving the foundries are weighed. By taking the yield of 73 per cent and adding the weight of sprues, gates, risers, over iron, and foundry tools, the loss can be computed.

Fig. 7 shows cast iron (top) and steel briquettes in the melting stage as taken from the melting zone of the cupola. This illustration should dispel any doubt as to their remaining solid and compact. They actually fuse into one solid mass first and melt like any other piece of scrap.

Effect of Oil

The question is often asked if oil on steel briquettes affects the analysis. From Allis-Chalmers' experience the answer is no. Briquettes melted in a small crucible furnace show no effect of the oil, and in the cupolas this oil is burned off at the charging floor.

Another often asked question is whether scrap losses are higher when using briquettes. Again the answer is no. Scrap losses here at the present time are the lowest they have been in the history of the company. While it is not for one moment claimed that this is due to the briquettes alone, or that the iron is the cause of the low scrap, it is true that when the scrap is high the iron is always the first to be blamed. It is believed, however, that sympathetic foundry management, with a thorough background in gating, risering and other foundry problems has been the factor in lowering scrap and if the scrap is low the metal must be right.

Hot melting has an important influence on the use of materials at Allis-Chalmers, and the practice is to melt hot. In No. 2 foundry, metal is not acceptable under 2850 deg. F., spout temperature. Due to the number of transfers necessary in pouring small castings and in order to pour at 2600 deg. F., minimum, at the mold gate, it is necessary to melt above 2850 deg. F. Because of this, these cupolas produce iron for seven of eight hours at 2900 deg. F. and higher. No. 1 East foundry has a minimum melting temperature of 2800 deg. F. while No. 1 West, where the metal is used for large castings, melting is carried on at around 2750 deg. F. This, coupled with sound foundry practice, enables large amounts of briquettes to be used successfully.

Is it possible to use all briquettes or all scrap charges? While Allis-Chalmers has run considerable amounts of this type of iron, it is not prepared to say that it would be suitable for Class 20 irons or even Class 30 irons day in and day out. Yet, there is no reason to say that it would not be suitable either. It is believed here, at present, that it is strictly a problem of knowing

how to handle the iron at the spout and which is the most economical to melt. Runs here so far have all been in the nature of Class 40 iron and better. The highest deflection values that have ever been seen here on a 1.20 bar come in this type of iron, thoroughly inoculated with SMZ No. 2.

Savings by Briquetting

Is money actually saved by using briquettes? A marked savings at the present market prices is definitely revealed in the yearly melt of Allis-Chalmers of 60,000 tons. This results from the substitution of cast iron briquettes for cast iron scrap or pig iron in recognized cupola mixtures and steel briquettes for rails.

These mixtures, ordinarily composed of pig iron, steel rails and cast iron scrap, often include as much as 50 per cent pig iron or 75 per cent rails, and are varied to suit the metal desired.

The difference between the cost when using briquetting salvaged materials and the market price of the original material, however, does not reveal the added cost of inoculating these irons from the base iron, which is necessary, especially where a soft iron is desired.

These inoculations average 90c. a ton and at this plant a flux is used in the cupola, in addition to limestone, which also adds 20c. a ton. However, if, at the outside, $1.25 a ton is spent to effect a savings of as much as $7 a ton, a net savings of $5.75 a ton is possible.

It is true that when melting these types of materials, more supervision is necessary to take a chill test from each ladle of iron in order to have good control. It is also true that it is necessary here to run more analyses. However, the use of three chemists and three extra chill testers per day on a 300-ton melt will hardly amount to 20c. a ton. Even with this added cost, plus the cost of inoculations and extra fluxes and other costs that might be charged against briquettes, the net saving would be at least $5 a ton.

In presenting this picture of the use of salvage material, many details have necessarily been omitted by space limitations. However, it is the feeling at Allis-Chalmers that any information concerning the use of briquettes and salvage material, that would be of interest to foundrymen in the present crisis should be freely given and if any use can be made of this information, it will be to the advantage of the industry as a whole.

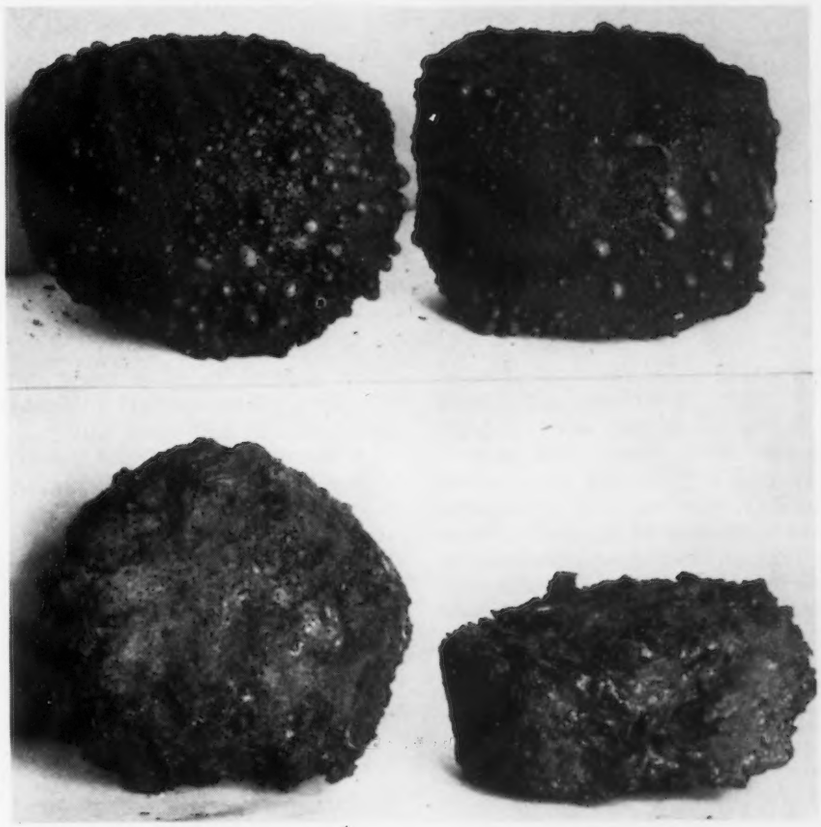

FIG. 7—Cast iron (top) and steel (bottom) briquettes taken from the melting zone to show how the briquettes first fuse into a solid piece, then melt.

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Soap Used in Tungsten Ore Flotation

TUNGSTEN bearing ores are being separated from accompanying minerals and dirt by the aid of soap, according to recent Russian metallurgical journals. In the extraction of scheelite, a tungsten ore, which occurs in the large Gumbey deposits in combination with a specially hard-to-separate group of minerals, the unwanted minerals are first deactivated and depressed by certain chemicals which prevent them from being floated. The sulfide ores present are then floated with butyl xanthate and pine oil and the scheelite is finally floated away using a mixture of soap and liquid glass.

Flotation methods such as this are being used in the United States, incidentally, for a large number of ores. This has been true especially in those mines that cannot be worked profitably in any other way. Soap is widely used in these ore flotation processes.

Electrodeposition of Hard Nickel

TO provide a corrosion-resistant, electroformed, hard nickel deposit with a high degree of hardness and tensile strength, coupled with satisfactory ductility, machinability, a temperature coefficient of expansion close to that of steel, good adherence to the basis metal, and production at moderate costs, W. A. Wesley and E. J. Roehl, assistant director and research chemist respectively of the International Nickel Co., Inc., Bayonne, N. J., made laboratory studies and pilot plant-scale examinations of various hard nickel plating baths. In the plating process, high cathode current efficiency, good throwing power, and high rate of deposition were sought, and largely attained.

According to a report to the Electrochemical Society, experimental deposits were prepared in glass battery jars containing about 2½ gal. of electrolyte. A constant temperature water bath was used to maintain the desired electrolyte temperature, and two flat nickel anodes were used in each jar, the immersed area of each anode being 8 in. wide by 8 in. deep. The cathode was placed midway between the anodes so that the anode-to-cathode spacing was 3 in. Anodes were covered with bags which were in some instances of glass fiber filter cloth, and otherwise of heavy canvas cloth. Cathodes were either flat or cylindrical mild steel bars.

A stream of air bubbles through a porous alundum thimble in the bottom of the bath prevented stratification in the electrolyte. When additional agitation was desired a cylindrical cathode was used and rotated at 1000 r.p.m. The electrolyte compositions, shown in Table I, were prepared from technical salts and were purified by the addition of an excess of freshly prepared nickel peroxide, which is an active oxidizing agent and also causes precipitation of iron, copper, and zinc.

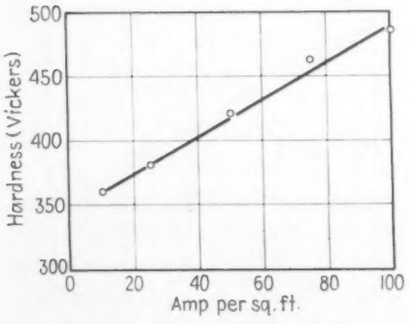


FIG. 2—Effect of current density upon hardness of nickel deposit, in modified bath. Bath temperature was 130 deg. F., and pH was 5.7.

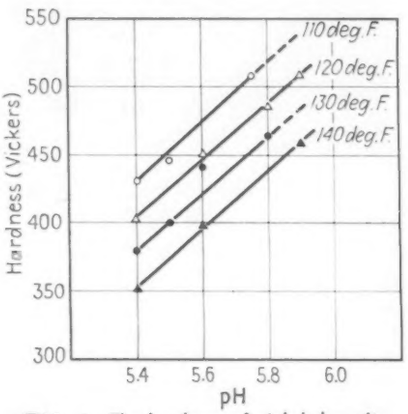


FIG. 1—The hardness of nickel deposits from the modified bath. Cathode current density was 50 amp. per sq. ft.

When the Macnaughtan and Hothersall electrolyte was used at the relatively high cathode current density of 50 amp. per sq. ft., the anode efficiency dropped when cathodes of an area approaching the anode area were being plated, or when the anode current density was increased above about 30 amp. per sq. ft. This difficulty was avoided by increasing the chloride content of the bath to a composition designated as "original" or bath No. I in Table I. Table II presents some results of miscellaneous tests which show conditions employed to obtain deposits of over 400 Vickers hardness. Hardness measurements were made with Vickers apparatus using a diamond pyramid point and a 10 kg. load. Only feeble evidence of systematic variation of hardness with either pH or temperature can be found in the data in Table II.

While some satisfactory deposits were produced, several features of this process were unsatisfactory and rejects were too frequent. Depositions thicker than 0.02 in. had a laminated structure which often separated when subjected to mechanical abuse or machining. Hardness of the deposit could not be closely controlled, varying with the thickness of the deposit and being affected by the nature of the base metal. There was a tendency for growth of "trees" at cathode corners, and the bath was poorly buffered thus requiring frequent attention to maintain a constant pH.

A nickel chloride plating solution offers advantages over the usual sulfate electrolyte. A bath similar to No. 1 in Table I but containing no sulfate irons was used, but burning of edges and corners was encountered in plating at 50 amp. per sq. ft. By doubling the nickel content of the electrolyte, giving a composition called bath No. 2 in Table I, this difficulty was overcome. Hardnesses for typical deposits from this chloride bath give evidences of a systematic increase in hardness of deposit with increase in pH or decrease in temperature. Reproducibility of hardness readings on duplicate deposits made under the same plating conditions was much superior to that obtained with bath No. 1. Buffer action was excellent, anode and cathode efficiencies were high, there was no pitting, practically no change in hardness with increased deposit thickness, and even the heaviest deposits were free from the laminations encountered in nickel from bath No. 1. One disadvantage of the chloride electro-

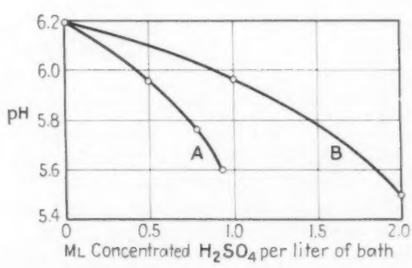


FIG. 3—Titration curves for original bath (A) and modified bath (B).

lyte, however, was that deposits from it had very high internal stresses which appeared to increase with increases in hardness. Deposits over 440 Vickers hardness cracked spontaneously, and softer deposits cracked when adherence to the base metal was not good.

Bath No. 3 possessed but little better buffer action than the original, so boric acid additions were made, forming bath No. 4. Preliminary experiments with bath No. 4 indicated that the solution was very much superior to the original bath. A tendency toward burnt edges at a cathode current density of 50 amp. per sq. ft., led to increasing the nickel content, giving bath No. 5, which was made free of potassium. This was named the "modified bath" as shown in Table I and has been adopted for all hard nickel plating at the laboratory. Hardness and thickness variations of the platings produced from the original and the modified baths (Nos. 1 and 5 in Table I) are shown in Table III. The deposits examined were stripped from nickel-chromium flat sheet cathodes.

The No. 5 or modified electrolyte is well buffered, contains sufficient chloride to insure high anode efficiency, and, consequently, can be easily maintained at a constant pH. Deposit hardnesses from it vary but little with changes in thickness and can be easily maintained by controlling the plating conditions. Heavy deposits can be made which are free from laminations, sound in structure, and have a high degree of hardness and tensile strength coupled with measurable ductility. Typical tensile properties of hard nickel are an ultimate of 157,000 lb. per sq. in., with an elongation of 6 per cent in a gage length of 2 in.

The good behavior of the modified bath has been confirmed by operation of a large tank at frequent intervals over a period of several years. Work has included experimental application of heavy deposits to surfaces of rolls, salvaging worn parts, coating machine parts for resistance to abrasion, and some electroforming. The bath should be made up to the composition given in Table I as bath No. 5 (Modified Bath) and should be purified before use to remove iron, lead, copper, zinc, and organic impurities. Plating conditions required can be selected from Figs. 1 and 2, and Fig. 3 will be helpful in estimating the amount of acid required to adjust the pH during bath operation.

TABLE I

Composition of Electrolytes Examined, Grams per Liter

Bath No.	Designation	Nickel Sulfate $NiSO_4 \cdot 7H_2O$	Ammonium Sulfate $(NH_2)_4SO_4$	Ammonium Chloride NH_4Cl	Potassium Chloride KCl	Boric Acid H_3BO_3	Nickel Chloride $NiCl_2 \cdot 6H_2O$
Y	Macnaughton & Hothersall	120	21		8		
1	Original Bath	120	21	6	8		
2	Chloride bath			17	8		205
3		90	16	4.5	6		30
4		90	16	4.5	6	30	30
5	Modified bath	180		25		30	

TABLE II

Hardness of Deposits from Original Bath, Cathode Current Density 50 amp. per sq. ft., Cathode being a 0.5 in. Steel Round Immersed 4 in.

Temperature		pH of Bath	Cathode Rotation, r.p.m.	Deposit Thickness		Average Hardness, Vickers
Deg. F	Deg. C			In.	mm.	
120	49	5.5	0	0.006	0.15	467
		5.6	100	0.016	0.40	418
130	54	5.4	0	0.007	0.18	475
		5.4	100	0.010	0.25	455
		5.6	0	0.010	0.25	440
		5.6	100	0.080	2.0	465
		5.8	100	0.045	1.13	470
		6.0	0	0.008	0.20	480
140	60	5.5	0	0.008	0.20	480
		4.8	100	0.008	0.20	456

TABLE III

Variations of Hardness with Thickness in Nickel Depositions. Current Density, 50 amp. per sq. ft.

Electrolyte	Temperature		pH of Bath	Deposit Thickness		Vickers Hardness		
						Surface		
	Deg. F.	Deg. C.		In.	mm.	Inner	Outer	Difference
Original Bath (No. 1)	120	49	5.6	0.019	0.48	525	495	30
			5.7	0.009	0.23	566	446	120
	130	54	5.6	0.007	0.18	500	330	170
			5.6	0.016	0.40	512	350	162
			5.6	0.021	0.53	519	423	96
Modified Bath (No. 5)	120	49	5.7	0.026	0.65	486	466	20
	125	52	5.55	0.019	0.48	434	422	12
	130	54	5.6	0.017	0.43	460	430	30
			5.6	0.020	0.50	432	414	18
			5.6	0.030	0.75	445	426	19
	130	54	5.6	0.008	0.20		431*	
				0.020	0.50		441*	
				0.038	0.95		426*	

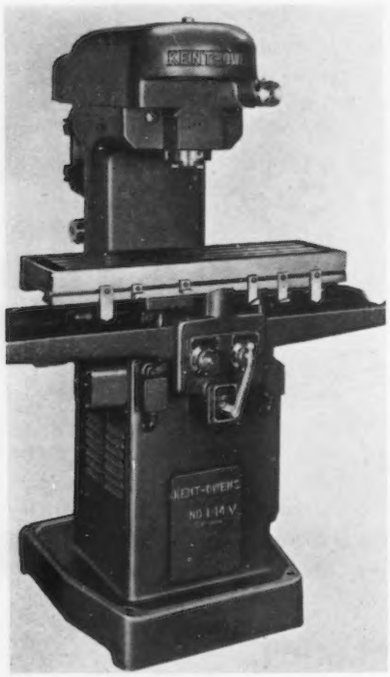
* These deposits were made on a 1.0 in. rod and were not stripped.

New Equipment . . .

Machine Tools

The machine tool industry offers a constant flow of new designs and improvements aimed at solving current production problems. A few of the recent announcements are shown and described here.

A NEW vertical milling machine No. 1-14V, designed especially for the vertical milling of small parts, has been announced by the *Kent-Owens Machine Co.*, Toledo.



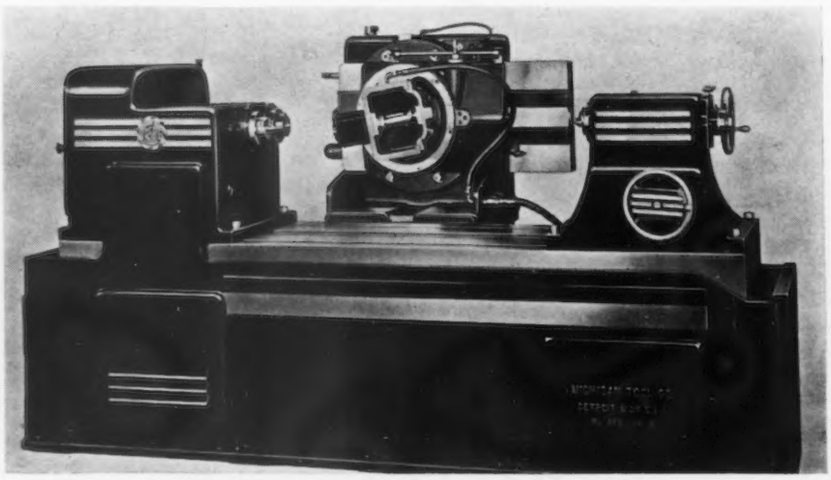
The machine features a fully adjustable, hydraulic table, having feed and traverse in both directions, automatic shift from rapid traverse to feed in either direction and automatic reverse at both ends of the stroke. The spindle head has screw and micrometer dial cross adjustment and the head carriage is adjustable vertically. Table feed rates vary from 1 to 40 in. per min. and ten spindle speeds give a range from 115 to 300 r.p.m. The spindle is V-belt driven and spindle speeds are changed by adjusting the belts to change the pulley ratio.

Gap Gage Grinder

VERSATILITY and simplicity in operation are two advantages claimed for a new gap gage grinding machine manufactured by *Ni-Lint Tool Co.*, Rockford, Ill. Longitudinal adjustment of the table is obtained with a hardened and ground screw working in a bronze nut and fitted with a micrometer dial reading to 0.0001 in. The cross slide is mounted on V-ways and is operated by a rack and pinion movement. It is said that the control of these two movements is simple enough to permit a relatively inexperienced man to become a capable gage grinder with a few hours training.

Rotary Gear Shaver

A THREE-WAY gear shaver, designated as 865-36A, capable of handling gears up to 36 in. diameter, is being produced by the *Michigan Tool Co.*, Detroit. The three methods permit, first, a horizontal position of the cutter, operating with infeed and reciprocating laterally with the face of the gear. This is used for gears having a greater face width than the cutter and up to 20 in. wide. The second method for gears having a face width narrower than the cutter, utilizes the cutter on a vertical slide without infeed and the cutter head moves down until it has passed the maximum depth of cut, then returns to starting position. The third method is a combination of the first two methods, using the cutter on a vertical slide with infeed and with the cutter head reciprocating vertically. Gears from 4 to 36 in. diameter can be handled with face widths up to 20 in.



Wet Tool Grinder

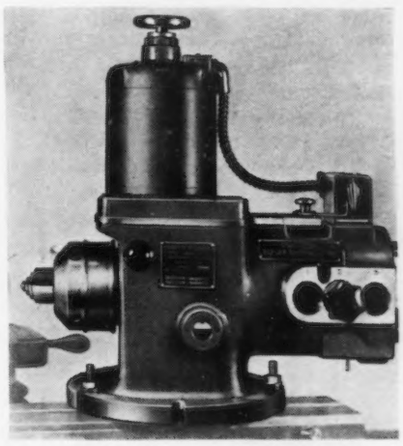
HAMMOND MACHINERY BUILDERS, INC., Kalamazoo, Mich., announce a new 20-in. wet tool grinder, model 20-S, for the grinding of all hard metals, alloys, and tungsten carbide. The standard machine has the new tool rest and wheel dresser. The tool rest is adjustable to any desired angle and the wheel dresser, which is an integral part of the assembly, adjusts in and out from the wheel by a detachable hand crank and screw mechanism. The grinding wheel is 20 in. in diameter by 2½-in. face. The wheel hood is hinged and provides quick access by removing two capscrews for wheel changes. The design permits use of an 8 x 8 in. table. Table tilting mechanism is optional.

Heavy Duty Planer

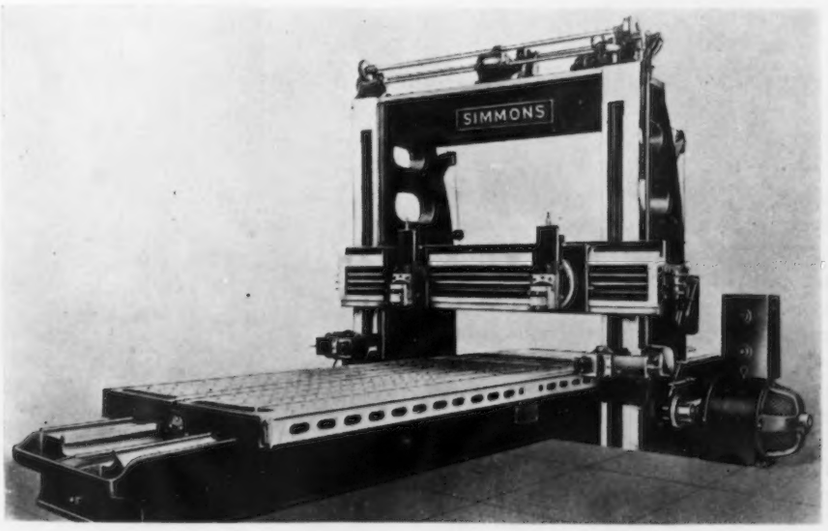
A NEW heavy duty, 120 x 96 in., planer has been developed by the *Simmons Machine Tool Corp.*, Albany, N. Y., featuring a power driven rapid traverse for all heads through especially designed clutches. Traverse and feed are interlocking, making it impossible to engage both at the same time. The machine also is described as having a double length enclosed bed with forced lubrication, Sykes herringbone gears up to the bull gear, bronze shaft bearings and ball thrust bearings on the rail and sidehead feed screws, adjustable taper grips, micrometer collars for feeds, and power elevating device for the rail. Table speeds are from 19 to 115 ft. per min. with a 50 hp., 230 volt d.c. motor operating from 150 to 900 r.p.m.

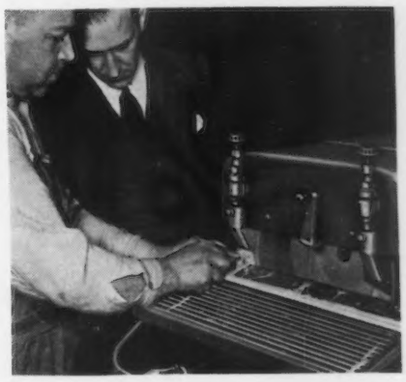
Drill Sharpening Attachment

PRATT & WHITNEY DIVISION, NILES-BEMENT-POND CO., West Hartford, Conn., offers an attachment for universal



cutter grinders and similar grinders, for sharpening single lip drills with straight or helical chip grooves of ⅝ to 2 in. diameter. Selective cam action on this attachment permits predetermining drill tip angles and sharp cutting edges. Although designed primarily for sharpening step drills, it provides for sharpening V-shaped drills and other cutting tools of similar shape.





No-Splash Carbide Tool Grinder

"NO-SPRAY — NO-SPLASH" wheel guards feature the Model 10 and 14 carbide tool grinders recently announced by *Hammond Machinery Builders, Inc.*, Kalamazoo, Mich. The new guards and coolant control are said to keep the floor dry during wet grinding operations, and permit maximum light and freedom to the operator. The guards move in or out from the wheel by a convenient crank and are easily removed for wheel changes by taking out four capscrews. Flexible supply hoses for coolant permit movement of the guards without disconnecting the hoses. Crank and worm mechanism tilts the table to 15 deg. above or 30 deg. below horizontal. Both models are available for either wet or dry grinding.

Internal Die Grinder

DEVELOPED especially for precision internal grinding such as is required for dies, a new internal grinder No. IG, built by

the *Abrasive Machine Tool Co.*, East Providence, R. I., is particularly recommended for use in connection with dies used in bullet and cartridge manufacture. This machine will grind holes up to 12 in. diameter, has a longitudinal travel of 8 in., and spindle cross feed of 3½ in. Both cross and longitudinal feed are adjusted by handwheels graduated in units of 0.001 in.

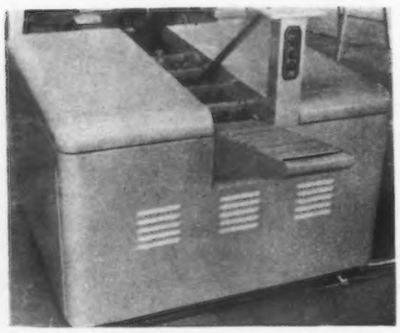
6-In. Rotary Surface Grinder

THE ability to grind extremely flat surfaces is a feature claimed for the new rotary surface grinder recently produced by the *Taft-Peirce Mfg Co.*, Woonsocket, R. I. An exclusive feature is claimed in the tilting wheelhead which makes the machine suitable for shoulder grinding work. The wheel

spindle swivels in a vertical plane about the center of the wheel and is carried in a cast iron block mounted between two pairs of circular dovetail slides, permitting swiveling through an arc from horizontal to 30 deg. below center. The magnetic chuck has a 6 in. diameter face which permits the holding of small pieces at the work center. The elevating mechanism is operated by a handwheel having widely separated graduations of 0.0005 in. thus providing extreme accuracy in setting and close tolerance adjustment. This grinder uses a 7 in. diameter wheel with ½ in. face and 1¼ in. hole.

Primer Body Automatic

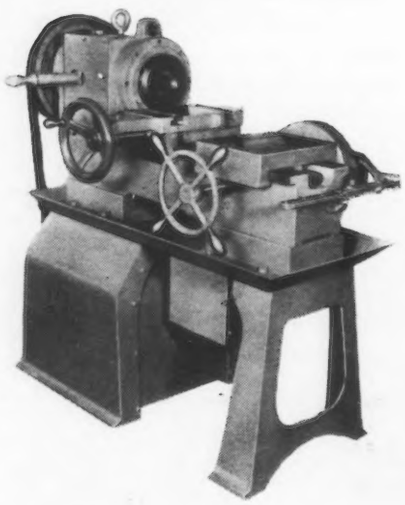
AN automatic machine combining machining and assembly operations on percussion primer bodies, is announced by the *Watcher Design Co.*, Cincinnati. It is adaptable to the several standard body lengths up to 10 in. and is also adaptable to other similar products. Cut-to-length tubing is fed into a hopper at the front and after being



faced, counterbored, reamed and tapped, a plug which is fed from a magazine, is screwed in and locked by spinning. All operations are automatic although a number of stations are provided where parts can be removed in process for inspection or substitution. Electric gages control the plug assembly operation according to the manufacturer. The machine utilizes six spindles including the automatic screw driver.

Production Lathe

THE *Lindsay Engineering Co.*, Cleveland, has brought out a new 3¼ in. collet size production lathe. The basic machine has cross-

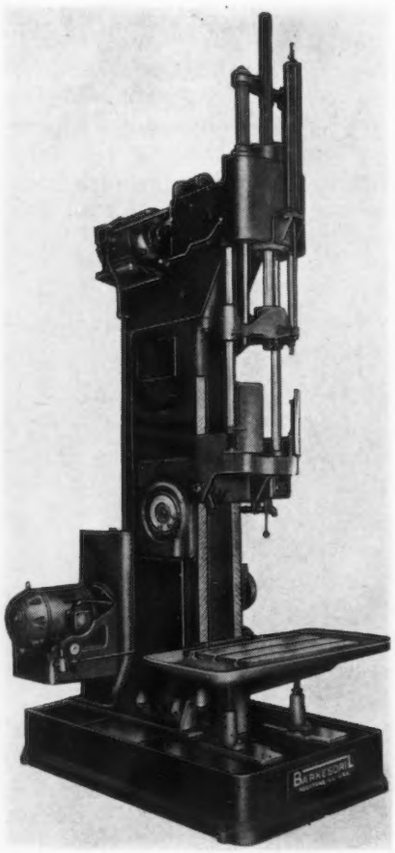


slide, tail slide and power feed, less tooling, which may be of varied types, such as: Six-position turret on tail slide, profiling feature on cross-slide or taper attachment for contouring attached to cross-slide.

The lathe is equipped with centrifugal plugging switch and automatic starting controlled from the collet lever, so that progressive movement of the collet will actuate collet and start the motor, or reverse sequence. Motor up to 15 hp. is mounted in base. A motor driven coolant pump can be fitted to the sump tank with cut-out thermal switch for motor protection. This lathe will handle shot, shells, bomb components or cartridge cases and other munitions parts.

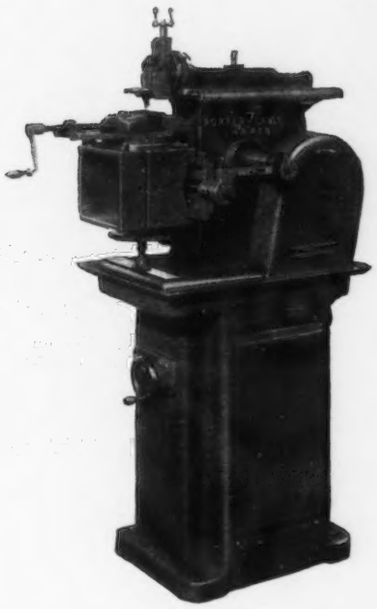
Vertical Honer

SUPERSEDING the Barnesdril No. 306H, the new No. 307 self-oiling hydraulic internal honer, made by *Barnes Drill Co.*, Rockford, Ill., hones bores up to 6½ in. inside diameter and has a vertical spindle travel of 25 to 45 in. in various size models. Separate motors are used for rotation and reciprocation of the spindle. Single speed or six speeds are available. Push-button controls permit "inching" the hone into the bore without rotation and short stroking can be controlled at any place in the entire working stroke to allow for removal of high spots. Major specifications include: Table to tool distance, 56⅛ to 62¾ in., standard swing 30 in., spindle reciprocation speed 10 to 75 ft. per min., vertical travel of plain table 17 in., recommended motors 5 to 10 hp.



7-In. Shaper

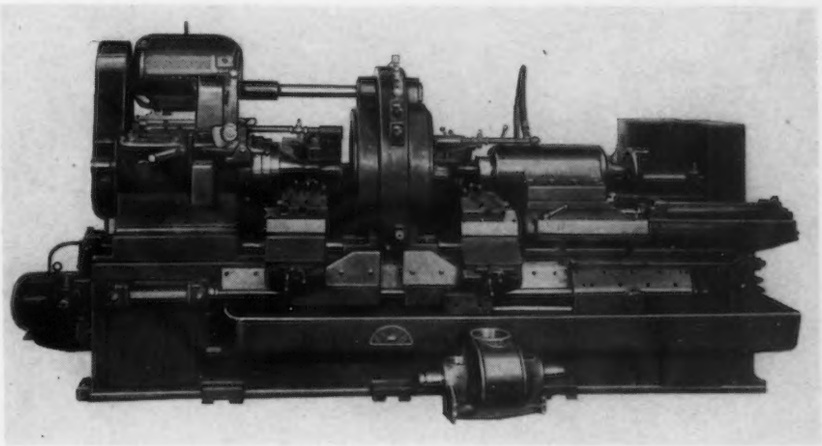
PORTER - CABLE MACHINE CO., Syracuse, is introducing a new 7 in. metal shaper with self-contained motor and speed control mounted in the pedestal. The 7⅜-in. ram travel can be operated at any speed from 64 to 175 strokes per min. A 4 in. diameter tool head



swivels 360 deg. and travels 2⅜ in. The ram is 16⅛ x 5 in. wide. An 8 x 8 x 7½ in. table has a traverse of 10½ in. and vertical travel of 5½ in. Six cross feeds are obtainable from 0.002 to 0.012 in. Tapered pins quickly locate the head and vise; the ram is micro set.

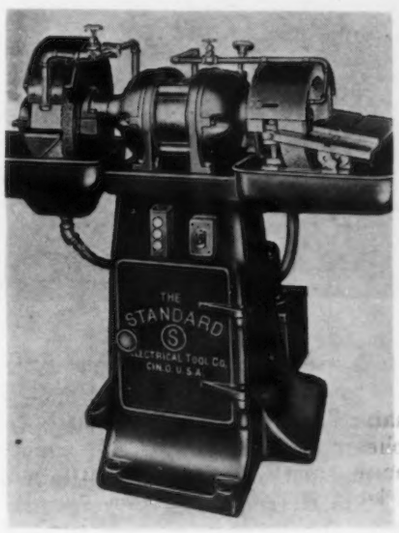
Hydraulic Turning Machine

A NEW double-end, hydraulic turning machine is announced by the Snyder Tool & Engineering Co., Detroit. A feature of the machine is the single hydraulic power unit which furnishes power to both the front and rear tool slides as well as the tailstock. This operating feature of the tailstock facilitates loading and hydraulic synchronization of the tool slides maintains a high accuracy of tool positioning. The entire machine is push-button operated. Anti-friction bearings are used throughout with pressure lubrication at all essential points. The center drive is Timken bearing equipped and provides an oil reservoir from which oil is carried to the bearings and gears by the main gear in the drive.



Carbide Tool Grinder

THE new tool grinder offered by the *Standard Electrical Tool Co.*, Cincinnati, provides facilities for an 18-in. roughing wheel and a 14-in. cup wheel, both operated from a single shaft at an efficient speed. The popular size is equipped with a 3 hp. 1150 r.p.m. motor and accommodates an 18 in. by 2½ in. roughing wheel with 10 in. hole. The opposite end of the spindle is provided with a steel plate for mechanically mounting the cup wheel. The machine illustrated has a wet grinding attachment but can be furnished for dry grinding. Two other models using 1 and 2 hp. motors for 10 and 12 in. wheels respectively, are also available.



Rotary Surface Grinder

A ROTARY surface grinder of the unit type, embodying the entire coolant system, motor, drive and fixed magnetic rotary chuck solidly constructed into a single

base, has been announced by the *Portman Machine Tool Co.*, Mount Vernon, N. Y. The entire motor head and column are adjustable for convex and concave, as well as flat surfaces. The chuck is driven by a separate motor and has five speeds. The 12-in. magnetic chuck provides a capacity for grinding parts up to 14 in. diameter and 9 in. high under a new wheel. The main drive motor is 7½ hp. and operates an 8-in. cup type wheel.

This multiple spindle machine is used to rough-and-finish cut the bottom, sides and dovetails of milling machine tables . . . In one "pass" through the machine, it performs a number of machining operations at high speed and with unusual precision. It eliminates many operations formerly requiring several separate machines . . . This unit is another of many specialized production machines designed and developed by Kearney & Trecker engineers to manufacture their own product — Milwaukee Milling Machines — in volume and to the highest standards of machine tool accuracy.

Milwaukee MACHINE

Rapid training of milling machine operators is an acute need today. As an aid in that direction we offer "Milling Practice" — a visual training course that has proven of real value and is in use throughout the country. For information — write our Department of Industrial Education.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN, U. S. A.

KEARNEY & TRECKER
CORPORATION

T O O L S

Assembly Line . . .

• Woman worker pool above expectations developed . . . Labor problems come to the fore . . . Difficulties ahead in truck output.

DETROIT—A tremendous pool of women willing to work in war factories is being built up as a result of a volunteer card distribution made at 750,000 Detroit households in mid-August.

Response has far surpassed the expectations of officials of the United States Employment Service. Their hope had been that some 80,000 women would volunteer for this work. Actually it now appears that at least double that number will be found to have indicated willingness to undertake factory jobs. However, USES administrators point out that when the time comes to open jobs to these women, many will not be available—through age qualifications, changes of mind, residence too far from places of work, and other reasons.

Tabulation has now been made of 63,880 cards of 260,000 already turned in. The anticipation is that somewhat over 310,000 cards will finally be deposited, so the counting to date would equal about a fifth of the ultimate total.

In the 63,880-card analysis, 56.6 per cent of the total replies expressed willingness to undertake war work of various types, and in this group no provision would have to be made for child care. Another 15.6 per cent wanted to do war work, but would require child care.

Of the first of these two groups, 8870, or 13.9 per cent of the grand total, reported experience in factory work and willingness to do more. No factory experience, but willingness to try it, was reported by 21,747, or 34.0 per cent of the aggregate. Willingness to do war work other than factory jobs was reported by 5519 women, or 8.7 per cent of the grand total.

If these figures are taken to represent a fifth of total replies (day-by-day samplings are registering fairly constant proportions in all divisions of the breakdown) then it would be indicated that when the tabulating is complete, there will be approximately 44,000 women who have factory experience and are willing to go back to such work, about 105,000 with no factory experience but willing to undertake it, and some 25,000 who will do war work other than in the factories. No provision need be made for child care in these instances.

A further backlog of help is furnished from the group which would require child care. Projections of these figures tabulated to date would point to 10,000 available women for factory jobs with factory experience, 30,000 available for factory work without prior experience, and 7000 available for non-factory work.

Early September was to see a meeting of management, labor and government officials, called to discuss the findings of the survey and make concrete plans for hiring and training the women who indicated availability.

These developments come against a pattern of growing labor scarcity within Detroit plants. Skilled labor, of course, has been at a premium for some time. On top of that, plants are now feeling the effect of gradually tightening supplies of less talented manpower.

THIS situation has become especially noticeable in plants which have had to close down spasmodically due to materials or parts shortages. General experience seems to be that when these plants reopen, fair proportions of their payrolls will have migrated to other factories where steadier work seems in prospect.

Migration also seems developing out of dissatisfaction with the amount of time worked—some men want more, others want less. There is also a continuation of labor piracy, it is said in some management circles here. And beyond all those factors, draft board calls are steadily becoming a more important factor. As result, the companies are looking ahead none too enthusiastically to the spring months of 1943, when the need for workers will eclipse present requirements.

The recruiting of women for war jobs, naturally, will act to alleviate this picture. But on the other hand, no small number of factory superintendents have private doubts as to the effectiveness of women in broadened spheres of work. They are worried over possible declines in efficiency of their plant operations if they have to increase their proportion of female help appreciably.

Meanwhile, the one-time automobile industry is considering the execution of a huge morsel of business shaped for it by the armed services — the output of 880,000 military trucks of varied classification.

Production of this largest truck order in history will be an extremely difficult matter. Such sentiment in Detroit, whose industry completed 1,094,261 U. S. truck assemblies during 1941, stems primarily from the axle situation, secondarily from others.

Present specifications for most military trucks require driving axles for all wheels. A six-wheel truck will require three axles, rather than one, as ordered in normal commercial channels. On the whole, it has been estimated that axle requirements for military vehicles are considerably more than double the needs of the same number of civilian trucks.

This situation has so spurred conversion of all potential facilities to axle making during the past 12 months that the end of such changeover is now in sight. And manufacture appears to be close to peak operations — one important producer, for example, is turning out approximately four times the number of axles produced a year ago.

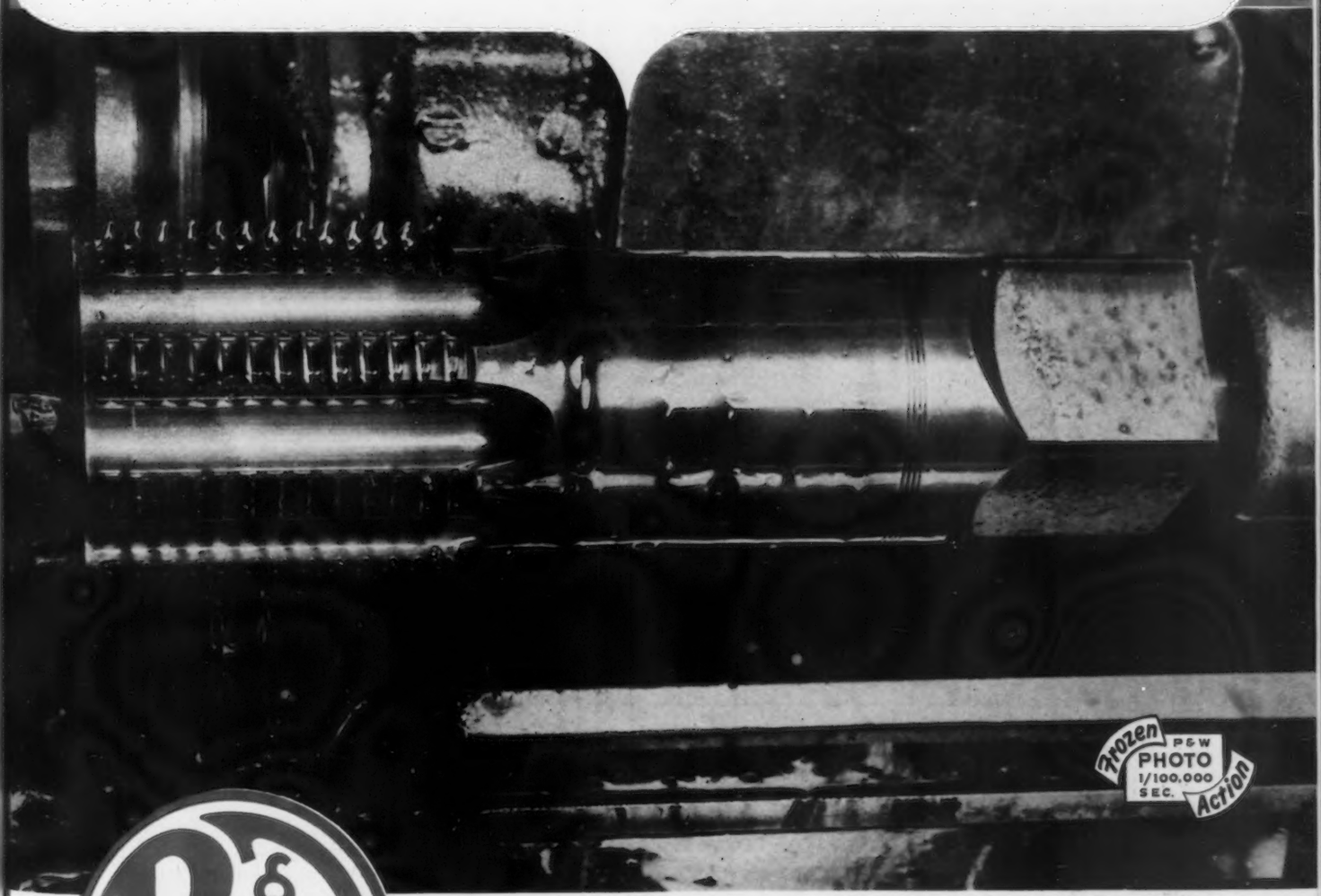
BEYOND the need for more facilities in order to produce more axles, there is the continuing problem of obtaining the necessary alloy

Give 'em the works
ALL DAY, ALL NIGHT

Yes, that tap is as big as it looks . . . big enough to cut the clean, strong, accurate threads that stitch America's heavy war machines together . . . big enough to make Adolf wish he'd stuck to paperhanging.

That's a P&W tap . . . one of the thousands daily going into 168-hour-week service in war production. It will turn out *plenty* of jobs, take a terrific beating before it's ready for the scrap pile. *So will your smaller P&W taps, dies, reamers, cutters. So will your P&W machine tools, and your P&W gages.*

This war has opened the eyes of many American metalworkers to the unexpected heights of stamina, staying power, *guts* of P&W equipment. Remember this lesson . . . apply it in your own work; *don't spare the pressure . . . your P&W tools can take it.*



P&W Photo — Unretouched.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD • CONNECTICUT

steels. One Detroit source said late in August that his understanding was that some 19,000,000 tons of alloy steel were needed per year, at present consumption rate—against visible supply of not more than 11,000,000 tons!

In view of such discrepancies, then, the consideration which will determine the output of 880,000 military trucks, or of tanks, or airplanes, or guns, lies in the military strategy of the moment. For example, the industry was heavily involved during the winter in the development of armored cars for use on the Libyan desert. When the British were making gains, emphasis on such development work lagged. When the Germans moved forward, orders were hastily dispatched to speed up this work. Now, with the Germans beyond Tobruk, all efforts are being made to hasten this production.

As a matter of fact, the output of armored cars may soon be an important large-scale operation in the automobile industry. Several companies have been engaged in turning out pilot models of such vehicles. Some are with four wheels, some with six, and some with eight; and gross weight runs up as high as 14 tons—the equivalent, and more, of a light tank.

The armored cars bear kinship to the tanks, except in the use of wheels rather than endless tracks. One producer is in the first stages of volume production on such armored cars, turning out pilot models of a four-wheel variety during August and expecting to be at fairly good rate of output by the end of the year. These units are powered with two motors, attain a top speed of close to a mile a minute, and mount a small cannon and a machine gun. Another maker in the automobile industry is engaged in turning out some eight-wheel jobs, but it does not appear that this type will be continued to the large volume stage. A third maker is now in preliminary manufacture of a six-wheeler.

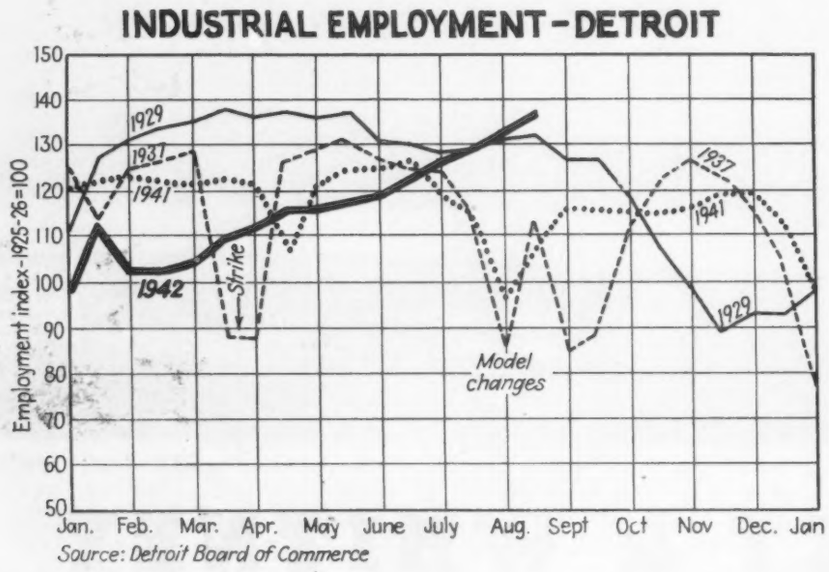
The considerations of military strategy, coupled with tightness in steel, are expected to lead soon to a marked curtailment in the output of shells. Detroit manufacturers hear that many shell producers will not have their contracts renewed when present commitments are completed. Some high estimates are that more than 100 factories now manufacturing shells may be idled by the end of this year. It appears that this field of manufacture was one in which output was so far ahead of anticipation that curtailment can be safely and logically undertaken.

Spare parts for these and other vehicles are currently the subject of discussions between the auto companies and the armed services. The Army requires, in the case of motor vehicles, a spare part stock amounting to about 25 per cent of the dollar volume of the complete assembly order. These spare parts are shipped in bulk.

The auto industry is recommending that the government utilize the so-called "cannibal" system of handling spare parts. That is, complete assemblies of trucks would be furnished in quantity 25 per cent above the number ordered. When the first truck broke down it would not be repaired, but its workable components would be utilized to feed requirements of other breakdowns.

The auto companies contend this would actually give the armed services more vehicles to work with, at only slightly more than the cost of the system as now constituted, and would provide the same number of spare parts presently obtained. The Army objection is that forces in the field do not have time to tear down vehicles in order to obtain needed parts for other vehicles.

EMPLOYMENT IN DETROIT today is probably at an all-time high. As of Aug. 15 the Board of Commerce index had risen to 137.2, only a fraction of a point away from the all-time highs of 137.8, reached on March 15, 1929, and 137.3, reached on April 15, 1929. The Aug. 31 figure, expected to establish a new record, will be available about Sept. 10.



Source: Detroit Board of Commerce

Birmingham to Work Not March, on Labor Day

Birmingham

• • • **No official** proclamation declaring Monday, Sept. 7, a legal holiday as Labor Day, will be made this year by the Birmingham City Commission. Commission President Cooper Green said no proclamation would be made "because the American Federation of Labor's local membership, the CIO organization, United Mine Workers and the various railroad groups have decided to work that day as their contribution to the war effort. There will be no parades or celebrations. . . ."

U. S. Steel Subsidiary in Tubular Field Changes Name

Chicago

• • • **United States Steel Corp.** has announced that the name of its new subsidiary, Tubular Products, Inc., has been changed to Tubular Alloy Steel Corp. Tubular Products, Inc., early this year acquired the existing plant of National Tube Co. in the Chicago district for the purpose of producing seamless tubing of alloy and stainless steel.

What About Your Tool Steel Scrap?

Get in the Scrap
FOR VICTORY

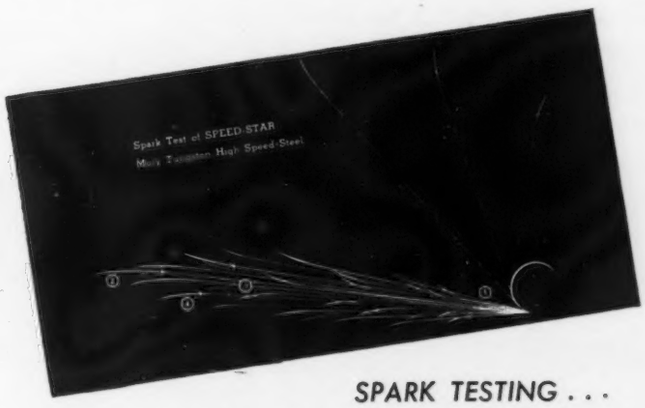
Before you say you haven't any around your plant . . . think a moment! In almost any plant, over a period of years, things accumulate.

For example, obsolete dies, tools, jigs and fixtures made of carbon and alloy tool steels get put aside in some storage corner. Broken or worn-out tools can be found in odd places throughout the tool room, machine shop and the plant in general.

Now the time has come to houseclean every corner, every storage bin, every possible hiding place to dig out such obsolete, discarded, broken or worn-out tools. Start them on their way back to usefulness via the scrap route. They are urgently needed to make up the scrap shortage that is curtailing America's war production.

You can render your country a service by organizing a scrap salvage drive in your plant at once. Explore all the departments—collect every bit of metal you can find—don't overlook those old tools—the alloys they contain are vital to war production.

For help in identifying tool steel scrap for salvage, see the Spark Testing Method described below.



Spark Test of SPEED-STAR
Moly Tungsten High-Speed Steel

The spark stream is full, having many heavy carrier lines (1)—light in color, and varying in length and thickness. The thicker ones are continuous, while the thinner ones are disjointed.

The thicker lines gradually swell into bright orange tongues (2) having a slight curvature, some upward and some downward. There is a tendency for some ghost-like lines to be carried around the periphery of the grinding wheel. Some few sprigs (3) and an occasional suppressed burst (4) are visible.

SPARK TESTING . . .
An aid to identifying Tool Steel Scrap

By holding the unknown piece of tool steel against an emery wheel, and watching the pattern of the spark stream, you get a quick indication of the major alloys present. To help your men become familiar with Spark Testing, a new Chart has been prepared by our own testing department. Ten different spark diagrams are shown on the Chart. These diagrams indicate the spark characteristics that identify each Carpenter Matched Tool Steel. With the Chart as a guide, men can readily become familiar with this method of steel identification. Not only is it helpful in separating mixed scrap, but Spark Testing is also valuable in identifying pieces of tool steel that have become mixed in stock. A note on your company letterhead will bring you one of these Carpenter Spark Testing Guides, made up in the form of a large Wall Chart 21" x 30" in size—showing the identifying *pattern* of the spark streams.

SPARK CHARACTERISTICS OF VARIOUS ELEMENTS are clearly described on this chart. And complete instructions are given for *Spark Testing* tool steels.

THE CARPENTER STEEL COMPANY
121 Bern Street, Reading, Penna.

Carpenter MATCHED TOOL STEELS

Washington . . .

• WPB approves test of Navy - sponsored warrant system of production control . . . Plan would toss burden of material distribution back into lap of industry.

WASHINGTON—With some reluctance, WPB on Aug. 15 approved a trial of the Navy-sponsored warrant system, the Contract Production Control Plan. Three Navy contracts for walky-talky radios are to be the guinea-pigs.

While the companies which will operate under the plan will use priority ratings to get materials after they have been authorized, the system does not require the use of ratings, and if the experiment is successful, CPC may supersede the PRP plan and the entire priorities system as well.

The essence of the plan is production and material control to be obtained through contract authorizations. Prime and subcontractors are to furnish the exact material content of each product or part contracted for by the Navy.

The Navy will control the delivery rate and the production urgency, and WPB will control the amount of material to be made available to the contractors.

The instruments by which the plan operates are Forms CPC-1 and CPC-2. Forms CPC-1 are summaries of Forms CPC-2, the former being filled out by the prime contractor and forwarded to the Navy for material authorization. Forms CPC-2 are filled out by the prime and subcontractors jointly, but this form is for subcontractors or part suppliers. Prime contractors after receiving their material authorizations, may process and authorize subcontractors to secure materials.

THE CPC forms provide for the showing of the following information:

Prime Contractors' or part suppliers' names, prime contractors' main office address and that of the part suppliers, plant locations, prime contract numbers, lot numbers, contract dates, purchase order numbers and dates, prime contractors' part or piece numbers, including drawing numbers.

Description of part, number of parts per unit exclusive of spares, total number of parts ordered, parts deliverable through Sept. 26, the balance of parts due.

Total number of units under contract, date first unit promised, date last unit promised, number of part suppliers, number of different parts, actual weight per unit.

CPC-1 requires that the unit delivery schedule by months be shown, together with the units completed prior to Oct. 1 and those to be completed after Dec. 31. CPC-2 requests information showing part shipments as scheduled by the weeks of the fourth quarter, with indication of the numbers required, promised, and actually delivered.

The material requirement portion of both forms is divided into 10 columns. Three of the columns are headed by the months of the last quarter of the year. The material code symbol, material description gross and net unit and part weights, including manufacturers' loss and rejects, unit of measure and inventory are the headings which take up the remaining columns.

THE material code symbols are to be found in the June edition of "Official Classification of Raw and Basic Industrial Materials", issued by the Army and Navy Munitions Board. It is sometimes referred to as "The Red Book".

Material description, abbreviated wherever possible, should be stated in terms of specifications which may be Army, Navy, trade or other material specifications. An example would be SAE 1020, etc.

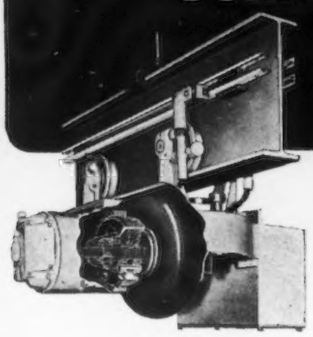
Prime contractors are instructed to show under "Unit Weight in Pounds—Gross Weight" a total made up of the Part Gross Weight of that material in every part included in the completed unit, tak-

ONLY ZONARICH SMILES: Notable at the Pittsburgh conference over a threatened CIO aluminum strike was the smile of union president N. A. Zonarich (center). Lieut. Col. George E. Strong, procurement officer for the Army Air Force (right) and Paul M. Hall (left) of the WPB, are met with Zonarich in a joint effort to avoid a threatened strike vote resulting from a WLB refusal of a wage increase demand.

Wide-World

AMERICAN MONORAIL EQUIPMENT

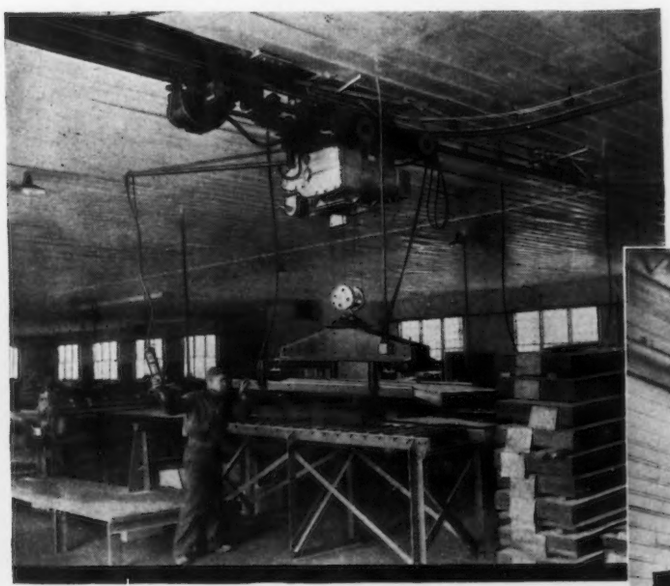
TURNS BACK-BREAKING HANDLING INTO FINGER-TIP HANDLING



Here are photos of two plants that have recently installed American MonoRail Overhead Handling Equipment. In both of these plants, tons of sheet steel are handled as easily as a small boy handles his electric train—with the same finger-tip control. The handling of heavy loads has become practically child's play. These two installations are typical of hundreds of others that have solved their back-breaking jobs with American MonoRail Equipment.

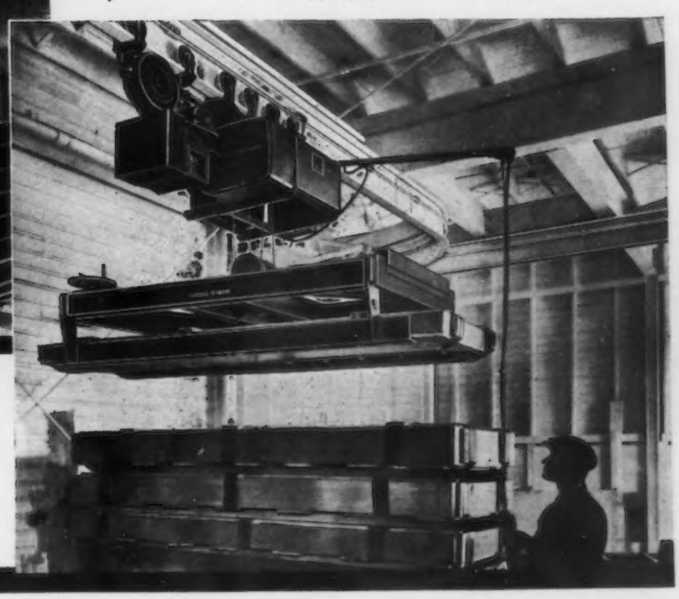
Today, production is handled with unheard of speed and efficiency. American MonoRail Equipment is playing an important part. An American MonoRail Engineer will gladly explain the advantages of this equipment in your plant. This service is without cost or obligation—furthermore, there is no delay or shutdown during installation. Write today.

WRITE FOR Blue Book illustrating hundreds of MonoRail installations



◀ Push button switch controls Mono-Tractor, hoist and special grab operation.

▼ Five tons of steel travel overhead by finger-tip control.



THE AMERICAN MONORAIL CO.

13103 Athens Avenue Cleveland, Ohio

★ ★ ★

ing this figure from the part supplier's CPC-2 forms. This Gross Material Part Weight should be multiplied by the number of parts included in a unit, exclusive of spares or overages. This column should be totaled, with entries in pounds carried to three decimals.

Data to be furnished by prime contractors under the heading "Unit Weight in Pounds—Net Weight" should receive like treatment.

Under "Unit of Measure" both prime and sub-contractors should use the unit of measure set forth in the red book, and prime contractors should show in the inventory column should show sub-contractors' inventories as indicated in forms CPC-2.

IN the month columns should appear the total requirements of the material described, and the CPC-1 returned to the prime contractor will show uniform percentages of materials allowed by WPB to be put in process each month.

Prior to the preparation of CPC-1, the prime contractor is directed to prepare and forward to the contracting agency a complete list of parts, including those which he manufactures. This list should include the purchase order numbers, part description, number of parts ordered in the unit contracted for by the government, number of spare parts ordered for overage and the names and addresses of part suppliers. A consecutive list of numbers, beginning with No. 1, is required to be placed at the extreme left side of the list—these numbers to be referred to as "CPC Part Numbers". This form is to be designed by the prime contractor. One such list is to be submitted.

Prime contractors are required to file form CPC-1 in triplicate with the Navy on or before Sept. 25 to cover material content of every part included in each prime contract included in the experiment. Prime contractors are instructed to check carefully the delivery promises, and the material requirements.

A PORTION of the instructions to prime contractors showing the responsibility resting on them in the successful operation of the plan follows:

"We will depend on you for accuracy of all part suppliers' promises and bills of material totaled under this form. You are urged, therefore, to check as carefully as possible all of your part suppliers' unit weights (both gross and net) and monthly material requirements before totaling them on this form.

"If you have reason to believe that any part supplier has made incorrect material requests, either excessive or insufficient, or has promised delivery not consistent with his production capacities, please return the part suppliers' form for adjustment before including it in your totals.

"Be sure that your part suppliers have promised you a flow of parts sufficient to fulfill your requirements for the deliveries you schedule on this form.

"Fulfillment of unit delivery promises and of the part delivery promises will be followed daily by the contracting agency.

CONTRACT Production Control is based on proper work-flow schedules and failure of one part supplier to perform his promise may jeopardize the program.

"The prime contractor may act as purchasing agent for materials for suppliers who furnish him, or he may pass on the authorization by endorsing his part suppliers form CPC-2. The prime contractor will normally enter the same percentage under each monthly column on the CPC-2 forms as appears on the processed copy of the CPC-1 form. He may, however, increase or decrease this percentage on individual CPC-2 forms, provided he does not exceed in any month in the combined total of CPC-2 forms the quantity of materials approved on his CPC-1 form.

"The prime contractor's countersignature on these part suppliers' forms will then constitute authority to the part supplier to rate materials to be delivered to him on the basis of the percentages set forth.

"It is essential that materials approved under this form be available to your part suppliers and sub-suppliers at the time they are required. It will be your responsibility to determine prompt receipt by them of materials and to notify the contracting agency immediately of any delay in the receipt by them, or by you, of any materials or parts required under this contract."

THIS plan squarely tosses the burden of responsibility or failure of material distribution largely into the lap of industry.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

STEADY ME, STEVE! DO YOU SEE WHAT I THINK I SEE?
YEH, BUT I DON'T MIND THAT SO LONG AS THEY DON'T BRING THE IRONIN'! I GET ENOUGH BAWLIN'S OUT AT HOME FER KNOCKIN' DRESSES AN' FLUFFIES OFF CHANDELIERS AN' DOORS!
IF THAT GETS STARTED IT'LL STOP TH' SHOP! IMAGINE TH' COPS AT TH' GATE SEARCHING THRU TH' WEEK'S WASHIN'S GOIN' IN AN' OUT!
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.
THE FEMININE TOUCH
J.R.WILLIAMS
9-4

ONE OF THESE BOOKLETS *may break that inspection bottleneck*

Here are five booklets covering many of the types of Sheffield Gaging instruments. They present some of the most important advancements in the gaging art.

One of them may break that inspection bottleneck—improve your inspection practices—lower your costs.

"SHEFFIELD PRECISIONAIRE"—Describes the most modern air gage for checking all types of bores including long, inaccessible bores such as rifle barrels. Little skill is required to operate the Precisionaire—high accuracy and speed are obtainable by any operator with minimum training.

"SHEFFIELD ELECTRICHEK"—Describes the Electrichek, a fast, accurate gage for high production. Particularly useful where inspectors must be recruited from less skilled workers.

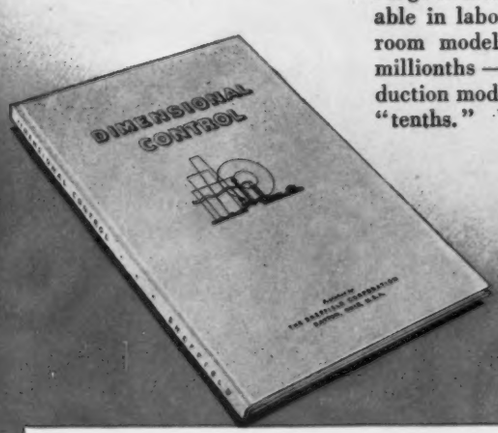
"SHEFFIELD VISUAL GAGE"—Describes a gage of wide range of usefulness—available in laboratory or tool room models, reading to millionths—and in production models reading to "tenths." Very easy to operate—extremely rugged in construction.

"SHEFFIELD MULTICHEK"—Describes the fastest and most useful gage available for checking several dimensions at once. The Multichek is relatively simple to set up—very simple to operate after setting. Widely used on shells, fuses, ordnance parts, etc.

"SHEFFIELD GAGES"—An 8-page digest of the Sheffield line of instruments; this booklet should be in the file of every key person concerned with gages and inspection. Included are descriptions of the gages mentioned previously, as well as the Sheffield Thread Lead Checker, the Sheffield Universal External Measuring Instrument, and the Sheffield Universal Internal Measuring Instrument.

"DIMENSIONAL CONTROL"—"Dimensional Control" is a new basic text on gages and their use in industrial inspection. It has been written for Engineering students, members of Defense Training Courses, and men in Industry who want a more complete knowledge of this phase of their work.

This is a 64-page book carrying 82 illustrations. It is 7¾" x 10⅝" with a special stiff cover and cloth binding—price $1.50 postpaid.



Write for one or more of these booklets that interest you.

★

THE SHEFFIELD CORPORATION • DAYTON, OHIO, U. S. A. • Dept. "A"

Please send me copies of the bulletins checked below free.

- ☐ Sheffield Precisionaire
- ☐ Sheffield Electrichek
- ☐ Sheffield Visual Gage
- ☐ Sheffield Multichek
- ☐ Sheffield Gages
- ☐ Send also a copy of *Dimensional Control* for which find my remittance ($1.50) attached.

Name_____

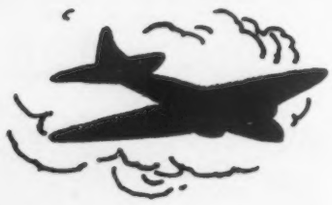
Company_____

Position_____

Address_____

WEST COAST . . .

• Kaiser shipyards shorten building time for vessels, and "less than 18 days" is new goal . . . Kaiser denies purchasing anchor bolts in excess of OPA maximums . . . Tie up with Howard Hughes may bring big change on San Francisco Bay.



SAN FRANCISCO—Last week, Henry J. Kaiser, who five years ago was recognized locally on the West Coast as representing one-sixth of a heavy construction combine—

—Saw the Oregon Shipbuilding Corp., which he controls, set a new national shipbuilding speed record by launching the hull of the S. S. Pierre S. du Pont, a 10,000-ton Liberty ship, in 26 days.

—Saw the Richmond Shipyard No. 2, which is another member of his string, set a new national shipbuilding speed record by launching the hull of the 10,000-ton Liberty ship, John Fitch, 24 days after its keel was laid.

—Predicted that before long Kaiser yards will be turning out 10,000-ton Liberty ships in "less than 18 days."

—Flatly denied that anchor bolts for the $50,000,000 steel plant which he is building in southern California, first fully integrated mill on the coast, had been purchased in Cleveland at prices in excess of OPA price ceilings as charged by that agency.

—Made no mention of a cement plant in Permanente Canyon in the Santa Cruz Mountains south of San Francisco, now rated as producing more than any other in the nation, although three years ago construction was opposed as a potential dust-raising menace by neighbors.

—Made no mention, either, of a multi-million dollar plant also bearing the Kaiser crest and also located in Permanente Canyon which one year ago was getting ready to go into production as the nation's largest producer of magnesium but which so far has proved little more than a costly laboratory, producing chiefly rumors.

—Announced that Howard Hughes, speed flier and aircraft engineer whose southern California experimental plant is admirably suited to huge aircraft, would be his associate in the production of a fleet of big cargo airplanes, Washington, D. C., willing.

—Conferred with Donald W. Douglas, president of Douglas Aircraft Co.; Glenn L. Martin, founder-president of the Martin Aircraft Co., and John K. Northrop, president of the Northrop Aircraft Co., regarding his proposal to build the big cargo planes.

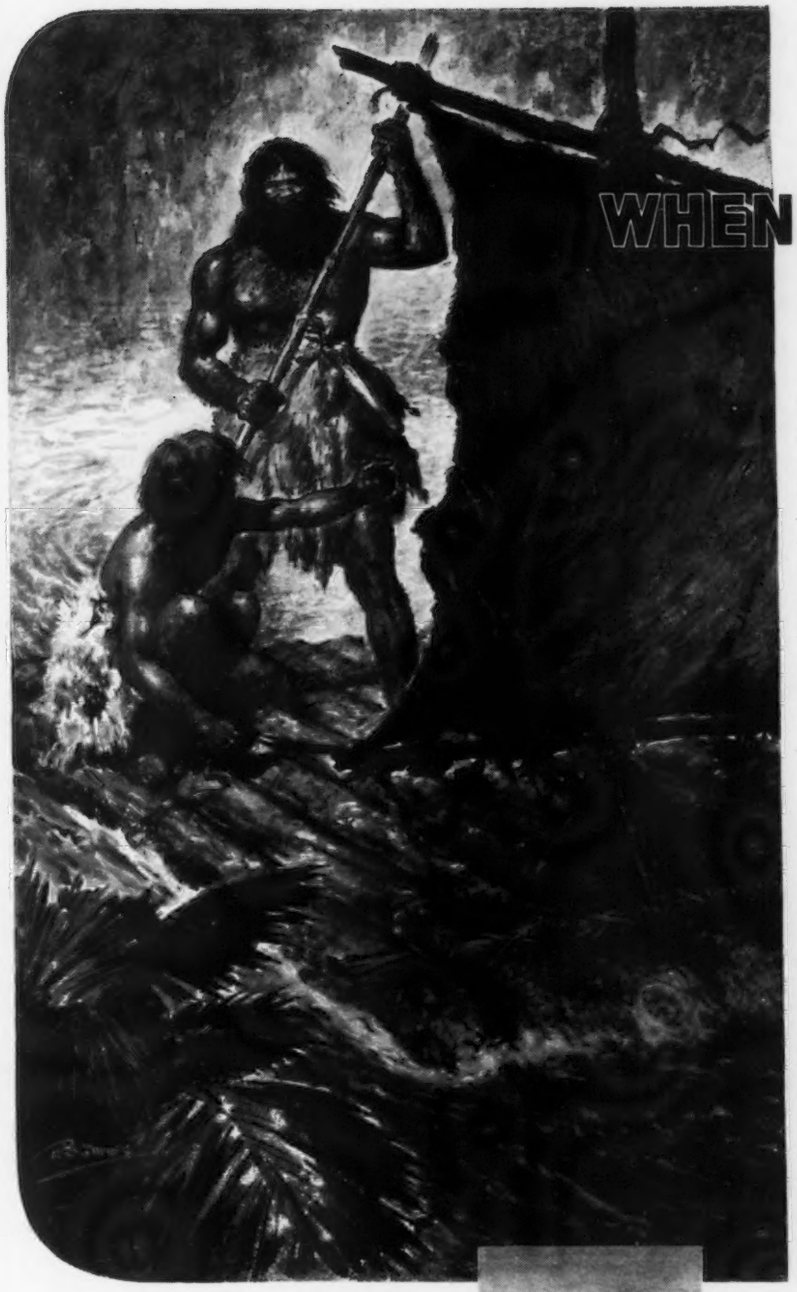
—Packed his bag to shuttle back to Washington, D. C., to sell his idea thoroughly to those government officials who doubt that 500 aircraft larger than the B-19 can be built by anyone without diverting material from the present combat plane construction program.

BY any standard, Kaiser was the biggest figure in the news last week, war or not. To readers of newspapers and news magazines, he was Lochinvar come out of the West to court victory for United Nations. To rivals in the shipbuilding, contracting and construction business, in the cement business, in the steel business and in the aircraft business who have tasted or who think they may taste the dust originally feared only by the Permanente Canyon neighbors, the Kaiser record was typified by the laggard magnesium plant.

To salesmen who have had direct dealings with him, Kaiser was no chuckle-headed visionary plotting 16 motored butterflies, but an extremely shrewd penny-minded buyer who insists on delivery on the dot. To personnel managers from Utah's copper pits to Oregon's forests, he was a labor pirate who lured workmen with fabulous wages assertedly made possible by cost-plus contracts.

Last week, too, some key personnel of the aircraft industry thought they heard the mating call of the Kaiser coffers. To organized labor, he was a man who signed on the dotted line and staged variety shows at noon that rivaled the best the theaters had to offer. To his business associates, he is and always has been a "solid fender," an ace production man who correctly valued the relative cost of man-hours, machines and material and a

GENERAL GRANT AND RESULTS: Seen emerging from behind a wrecked armored vehicle is one of the General Grant Tanks used by the 22nd Armored Brigade in the Egyptian Desert. The wreckage is significant of the power of this General Grant shown moving up toward the front line near El Alamein. *Press Assoc., Inc.*



WHEN *Æolus* WENT TO WORK

When the first enterprising human observed that wind was power, he devised a sail to make Æolus, the god of the winds, do the back-breaking job of moving heavy rafts. Later — much later — he put the wind to work at other tasks . . . lifting water and grinding grain.

Although man learned, through simple applications, to use and control power to lighten his work, he no longer depends upon capricious winds . . . today, he has engines for every purpose. Engines, however, have to be harnessed to their loads through *clutches* which permit engagement or disengagement at will.

The design and construction of these highly important devices has been the specialized business of the Twin Disc Clutch Company for 24 years. During this time, Twin Disc engineers and craftsmen have solved the problems of a multitude of particular jobs. For example: machine tools require clutch operation many times a minute; oil drilling rigs demand the flexible handling of excessive loads represented by long lengths of pipe; fishing boats call for smooth and easy transition from forward to reverse and back again. Twin Disc manufactures the right clutch for each of these—and countless other jobs.

Development and research are a continuing study at Twin Disc. Newer and better answers for tomorrow's problems are being discovered and tested today. If the machines you build require clutches of any type—friction or hydraulic—get in touch with us. Although war needs have first call on our facilities, your engineers and ours can plan now for new, after-the-war products. TWIN DISC CLUTCH COMPANY, Racine, Wisc.

Twin Disc marine reverse and reduction gears are rugged, smooth in operation. Clutches are self-adjusting for wear; reliable performance has been fully demonstrated in all types of work and pleasure boats, including high speed life boats.*

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.

keen nosed bellwether for a group of financially stable contracting firms.

Because so many and so widely varied estimates are offered of the true character of Henry Kaiser, depending on which facet caught the light when judgment was made, an impartial appraisal is well nigh impossible. It is possible, though, to chalk up the merits and demerits of each proposal and each project.

HOWARD HUGHES, Kaiser's new production associate, tosses out the suggestion that it is practical to build large cargo planes, such as he and Kaiser are considering, of wood. He does not declare that the planes should be built of wood and admits that metal, if available, has its advantages. Neither did Glenn L. Martin completely reject the wooden plane idea, but pointed out that the largest wooden plane to fly so far weighed only about 10 tons and the largest one projected little more than 45 tons. A Douglas Aircraft official tossed logs on the controversial fire by asserting that the aircraft industry could increase production in existing plants by 40 per cent if assured materials.

If Kaiser does get the go-ahead on aircraft construction, it is generally believed on the coast that the first of his shipyards to be converted to plane making may be one of those at Richmond, on San Francisco Bay. This, in itself, would be revolutionary, for, aside from a small sub-contractor, the San Francisco region has had nothing to do with aircraft construction, the largest aircraft plants being located 400 miles away. Not only would it be necessary to build the actual plant and assembly an organization from scratch, but either a complete string of sub-contractors and tributary suppliers would have to be developed in the region, or parts and components brought all the way from existing plants in Southern California.

Another apparently contradictory factor in the aircraft projects was a report from the remote mining districts, completely unverified, that engineers claiming to represent Kaiser have been examining deposits of strategic minerals, particularly chromite. This piece of rumor fits more logically with reports that Kaiser is anxious to produce alloy steel at his Southern California plant.

KAISER MEETS AIRCRAFT BIGWIGS: Henry J. Kaiser (next to right), who has just joined forces with Howard Hughes in a plan to mass produce giant sky-freighters, meets with (left to right) Grover Loening, WPB consultant; Glenn L. Martin, president of Glenn L. Martin Co.; Donald W. Douglas, president Douglas Aircraft; and (extreme right) John K. Northrop, president Northrop Aircraft. The meeting was for the purpose of sifting manufacturing details following a request of this nature to Kaiser by WPB.

Wide-World

THE latest shift in the war production current, not pronounced enough to be termed a trend, has resulted in the San Francisco Bay area currently having a stronger demand for heavy industrial labor than Southern California. Workers are migrating there from all parts of the country, but not in as great volume as previously. New shipyards are still coming into production around San Francisco Bay, whereas the peak is close at hand in other coast areas. So far there have been no appreciable production losses on the coast itself, because of lack of labor, although mines in other parts of the West have been hard hit. Wages in California shipyards last month kept well ahead of other major employing industries. Average weekly earnings for the shipyard workers was $55.27, for the aircraft worker, $44.71, for the steel mill employee, $46.42, for the lumberjack, $38.38, and for the metal miner, $38.16. That wage spread just about tells the story of the relative availability and scarcity of labor in those industries.

The government was called the culprit again last week in steel circles. It came to light that there are 15,000 tons of "dead" heavy armor plate in cold storage at a Pacific Coast yard. It has been on hand since the last war when plans for a certain type of craft were canceled. Only through a tip from a private metal dealer has it finally been possible to force offering it for bids.

Movement of industrial scrap by firms reporting to WPB's Industrial Salvage Section for the six far Western states from March through July originated as follows: Northern California, 137,000 tons; Southern California, 77,000 tons, and Pacific Northwest, 60,000 tons. Total, 234,000 tons. Of the total, 15 per cent came from shipbuilding; 10 per cent from the petroleum industry; 30 per cent from railroads and 13 per cent from public utilities—68 per cent from these four principal sources.

From July 25 to Aug. 25, scrap salvage moves reached 102,644 tons, over twice the average volume for the previous five months, on the coast.

Scrap allocation by the WPB Steel Branch in Washington, D. C., 3000 miles from the coast, so far has been extremely muddled and provides another good argument for further decentralization of WPB's powers. Reports indicate that scrap metal dealers at Los Angeles have been directed by WPB to ship several carloads to a mill at Niles, only 12 miles from Oakland, Cal., while at the same time, an Oakland or San Francisco dealer is directed to ship material to Southern California, the shipments passing on the way. Too many regulations, too many directives, too many allocations, and too much control from too far away are the bugaboos plaguing industry generally on the coast.

FASTER *Blueprinting* MACHINES KEEP WAR PRODUCTION HUMMING

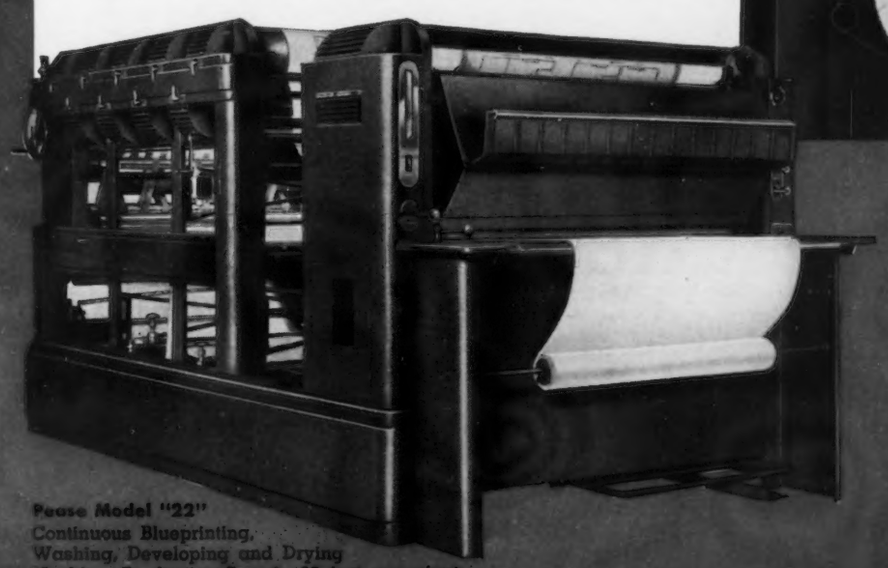
Guns, tanks, planes and warships on the nation's drafting tables deal no immediate crushing blows to our enemies . . . there is a gap between these engineering drawings and the production line . . . however, Blueprints at 30 feet per minute effectively bridge this gap, making war production hum full blast, 24 hours every day.

Pease Continuous Blueprinting Machines turn out finished prints faster, better and cheaper . . . finished prints that lie flatter, are more contrasty, have cleaner white lines and darker blue backgrounds . . . finished prints that insure a saving in time and money because of these outstanding features:

• **Sliding "Vacuum-like" Contact** (illustrated) • **Three Speed Lamp Control,** provides operation at 10, 15 or 20 amperes, does away with running speed and dryer heat changes • **Actinic "No-break" Arc Lamps** burn for 45 minutes without breaking arc, resume instantaneously • **Horizontal Water Wash** floats prints free from tension and prevents wrinkles, stains, bleeding • **Quick Change Chemical Applicator System** allows change from blueprints to negatives or vice versa in 30 seconds, very economical • **Rapid Drying Drums,** heated by gas or electricity and thermostatically controlled.

THE C. F. PEASE COMPANY

2695 WEST IRVING PARK ROAD • CHICAGO, ILLINOIS



Pease Model "22"
Continuous Blueprinting, Washing, Developing and Drying Machine. Production Speed—30 feet per minute.

SLIDING CONTACT

Smooths out inequalities in all tracings, gives 24¾" of uninterrupted exposure area and approximates vacuum frame contact. An endless belt assures even contact and, since paper and tracings are never stationary in respect to the glass, errors are impossible. Imperfections or dirt marks cannot print a number "3" as a "5," "6," "8," "9," etc.

Blueprinting Machines A TYPE AND SIZE FOR EVERY REQUIREMENT INCLUDING DIRECT PROCESS PRINTING

Fatigue Cracks BY A. H. DIX

New Note for Our Bugle

• • • Your favorite family journal has never made any secret of the fact that it is the world's largest carrier of advertising. On the contrary, we do not recall ever having missed an opportunity to enunciate this simple truth.

How effective the resounding of this particular note on our trumpet has been in calling new recruits to our army of advertisers, we have, of course, no means of knowing. As we look back over the years the only echo we heard with our own ears was an occasional grumble from our contemporaries that, in heralding our advertising superiority far and wide, we lacked delicacy. This, however, did not deter us, for our philosophy has been that of Diamond Jim Brady, who said, when criticized for becoming stoop-shouldered under his load of karats, "Them as has 'em, wears 'em."

But our faith in the efficacy of our monotone has been shaken by a survey reported recently in *Printers' Ink*. This survey reveals that those who make the things you buy are swayed hardly at all by volume figures. What causes their breath to come in short pants is evidence of close reading on your part.

We are not dismayed, for happily we can blow this note, too, and in any octave, thanks to the lavish evidence loving readers have sent to us, proving that the world's greatest industrial journal is literally gone over each week with a fine tooth comb, as the following instances demonstrate.

Gay Cavillier

See page 110, Aug. 20 issue, photograph captioned, "Huge manganese bronze tanker propellers produced 100 per cent ahead of schedule." How do you produce anything 100 per cent ahead of schedule? How cold is twice as cold as zero?

—A.W.M.

We do not know how cold twice as cold as zero is, but if your schedule called for so many propellers in one week and you produced twice as many, you would be 100 per cent ahead of schedule.

Ships in Nothing Flat

In your Aug. 13 "West Coast" section the paragraph about the California Shipbuilding Corp. reads:

Actual ship construction started at the yard little more than 10 months ago, and the first hull was launched last Sept. 27.

Ten months ago would be Oct. 13, and the first hull was launched on the previous Sept. 27. A new record of minus a couple of weeks or what?

—Allen L. Lindley, Jr.

The paragraph goes on to say that since then the total average production per man-hour has doubled, which would make the present record minus four weeks per ship. High employee morale is given as the chief reason, but we suspect that someone has cracked the fourth dimensional secret, and we are asking the Pacific Coast editor to report.

Safe Level

A recent advertisement reads, "American bombers can maneuver at 35,000 feet—safely above effective anti-aircraft fire." The very next advertisement is headed, "How to Hit a Bomber Seven Miles Up." Well?

—George A. Heinemann, Mason-Neilan Regulator Co., Boston

The contradictoriness of the two statements, as accentuated by their adjacency, merely emphasizes the change-without-notice schedule on which anti-aircraft gunners are operating at the moment. It is entirely possible that both statements were correct when written.

Epistolary Mountains

• • • We could, of course, go on and on like Scheherazade, citing instance after instance of microscopic reading. We could show you stack upon stack of line-of-duty letters, written as the result of something seen in your favorite family journal, proving that the one big, more or less happy family is extraordinarily responsive and that reader interest is white hot.

We would expect your eyes to pop, but then again you might yawn, so we will proceed with our regular knitting.

Anent

• • • The letter from Mr. Heinemann, partially quoted in the foregoing, reintroduced us to our old friend "Anent." We first met years ago in the old *Argosy*, long before that magazine went in for cheesecake and maidens who know no negative. It was love at first sight. The rakish swing of the word fascinated us even after we discovered its commonplace meaning, and to this day we have maintained our membership in what Bill McFee calls the "Seventh Day Anenters."

Through to the Heart

• • • A slogan that strikes us as exceptionally high in penetrating power is one coined by Stewart, Hanford & Casler, an advertising agency, 11 James St., Buffalo, which prints and sells a large wall poster headed "Honor Roll—Men from This Department Now Serving with the Armed Forces." Below that is space for the names to be filled in. And at the bottom of the poster is this stopper, "How many come back may depend on what YOU accomplish TODAY!"

Oh for the Life of a Mineral

I cannot resist the impulse to send you a clipping of a news item about Siberia that carries the imperishable sentence, "It teems with mineral life."

—W. H. Rastall, U. S. Tariff Commission, Washington

Mr. Rastall also asks, "What is an oxymoron?" We had a vague idea that it meant a fresh air fiend of low I. Q., but learn from our drug store dictionary that it is a phrase containing two contradictory words placed together for epigrammatic effect. Examples: *sad pleasure, quietly insane.*

Genius

• • • *"Your blurb about four out of five of your subscribers renewing reminds me," writes Deac, "of what I heard at a convention I attended recently. A young salesman of low flash point and high permeability was called on to speak 'Someone has said,' he began in a trembling voice, 'that genius is ten per cent inspiration and 90 per cent expiration.' He then proceeded to expire."*

Aptronym

A Westfield, N. J., general building contractor is named J. Vernon Wantshouse.

—R. A. Ness, Asst. Sales Mgr., J. D. Wallace & Co., Chicago

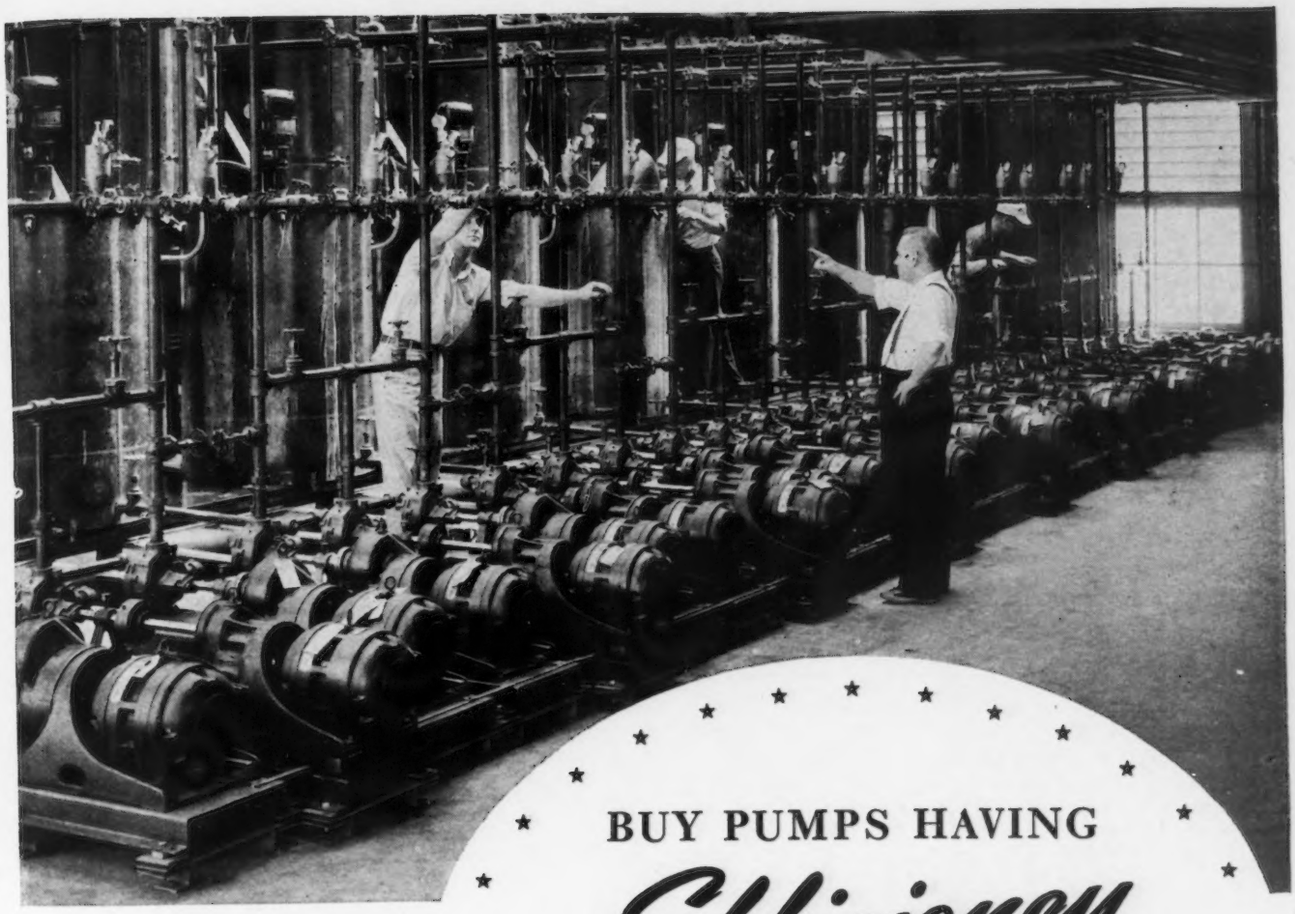
Puzzles

Last week's tube is 1/16-in. thick.

This one, picked up from Dictaphone's *"It's Said and Done,"* is old enough to be new again. If you can beat four minutes you are a quicker thinker than we are:

In the land of Aa there are only two classes of people—Huntsmen and Noblemen. Noblemen always tell the truth and Huntsmen always lie.

Three citizens were walking one day when the first made a remark identifying himself as one of the two classes. The second said, "He says he's a nobleman." The third said, "No, he's a huntsman." To what class did each belong?



These 36 F-M motor-driven rotary pumps in a large manufacturer's paint mixing room serve distant paint spray booths.

BUY PUMPS HAVING *Efficiency*

That's More Than Skin Deep!

THOSE pumps you are about to buy for war production—will they serve you efficiently not only now but also through the years to come?

They will if you choose Fairbanks-Morse Pumps. For these pumps have mechanical superiority which permits them to retain their efficiency long after less highly engineered pumps begin to waste power.

So use your priority to buy pumps for today with an eye for tomorrow. Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago, Illinois.

FAIRBANKS-MORSE F-M **PUMPS** *DIESELS MOTORS SCALES*

Dear Editor:

HITLER'S FUEL

Sir:

Your columns have contained considerable information from time to time concerning the German oil situation and the possibility that the German war machine may be stopped ultimately by lack of fuel. I think there are some interesting points which you may have overlooked.

There are two factors which make it much less likely that Hitler will be stopped by lack of engine fuel than is popularly believed. The first is the development in Germany of synthetic oil and substitutes. The second is the remarkable development of the diesel engine in that country.

On my last visit to Germany, I had the opportunity, because of my connection with The Cooper - Bessemer Corp., to investigate the production of diesel engines and the manufacture of fuels. Thousands of diesel engines were being constructed in Germany even then—for installation in tanks, trucks, tractors, trains and airplanes. In Germany, the diesel aircraft engine, as you perhaps know, is a reality and thousands of Hitler's planes are thus powered. This application of the diesel engine principle to the German war machine has resulted in a tremendous saving of fuel—and has upset the calculations of many "experts". . . .

The development of synthetics and substitutes in the Axis countries is the factor which really upsets the calculations of those who believe that the answer to the entire problem is merely a matter of adding up the total productions of the various oil fields under Nazi domination and then dividing the result by a figure representing the fuel consumption of the German military organization per day.

By the beginning of 1939, a tax of 51 cents a gallon had been imposed in Italy on gasoline and a 36 cent tax in Germany. The reason? To encourage the development of synthetic and substitute fuels. There also were direct subsidies. At that time, about one quarter of all motor vehicle transportation in the Axis countries was accomplished with synthetic or substitute fuels.

Gasoline made from coal gases was widely used. Alcohol made from vegetables was blended with straight gasoline. There were experiments with ammonia and acetylene. Some 25,000 vehicles in Europe used compressed gases as fuel. The German motorist, who had to pay 60c. a gallon for gasoline, could use city gas at a price equivalent to 43c. a gallon. Forty-one cents worth of methane also took him as far as a gallon of gasoline. Propane-butane fuel was more expensive—equivalent to 61c. a gallon —but one tank full took the motorist some 225 miles.

Other substitutes for gasoline and oil are oil made by hydrogenation, pulverized coal suspended in oil and oil "cooked" from corn, wood, algae, seaweed, leaves and similar substances in combination with limestone.

It is logical to assume that the rapid growth of synthetics and substitutes in Germany has been accelerated by the war. Although facts are hard to obtain since the war began, on either the diesel engine development in Germany or the synthesis of fuel, it appears to me that enough is known for those who predict an early defeat for Hitler on the basis of fuel exhaustion to be more cautious.

B. B. WILLIAMS,
President,
The Cooper-Bessemer Corp.,
Mount Vernon, Ohio

CHUCK

Sir:

We have a universal chuck and it has no manufacturer's name on it with the exception of D. E. W. Co.

You no doubt know who these people are so kindly let us have the address so we can send this chuck to the factory and have it repaired.

MISS N. KAUFMANN,
Southwest Mfg. Co.,
Santa Ana, Cal.

• Send it to D. E. Whiton Mfg. Co., New London, Conn.—Ed.

Sir:

In the May 21, 1942 edition you had an article entitled "Tubes Combined With Rounded Shape in Structural Design." In this article an hydraulic vise is illustrated. Since we are interested in flattening out of 1" diameter steel pipelines, we would appreciate it if you would let us know who manufactures this hydraulic quick acting vise.

E. B. STEINBERGER,
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.

• Studebaker Machine Company, 9 S. Clinton Street, Chicago.—Ed.

AIRCRAFT STAMPINGS

Sir:

We would like copies of the following articles published in THE IRON AGE as follows:

1. Drawing Dies for Airframe Stampings.—May 28, 1942.
2. Sheet Metal Aircraft Parts.—June 4, 1942.
3. Forming Convex Flanges and Joggles.—June 11, 1942.
4. Hydro Press Forming with Rubber Platens.—June 18, 1942.

The information detailed in these articles is of great interest to us and we will appreciate your sending these articles to the:

Methods Engineering Department,
Curtiss-Wright Corporation,
Airplane Division,
Buffalo, New York,
Att: Mr. H. Hummel

J. G. WOPPMAN,
Curtiss-Wright Corp.,
Buffalo, New York

• The demand exhausted our supply, so we reprinted them in the form of a 24-page pamphlet entitled, "Making Aircraft Sheet Metal Parts." Copies available at 25c. in stamps.—Ed.

NO LEVY

Sir:

On June 20, a man called at our office and told us that he represented your company and wanted payment for subscription for your magazine.

A check was given to him in the amount of $10. After receiving statements from you, we investigated the check and found that same was cashed in St. Louis, endorsed "IRON AGE by M. L. Levy" . . .

M. GOLDBERG,
Gus. Gillerman Iron and Metal Co.,
St. Louis, Mo.

• We know no M. L. Levy. Checks payable to THE IRON AGE may be endorsed only by the home office. Better send payments direct to 100 E. 42nd St., New York.—Ed.

PIPE BENDING

Sir:

We are interested in your article on precision pipe bending. You mention this was described in *Air Craft Production*, London, 1942. We should like to know where we could obtain a copy.

ART CHROME CO. OF AMERICA,
Boston

• We doubt whether you can get copies of *Air Craft Production* anywhere but at your library. You can, however, get all the data desired by addressing Cerro de Pasco Corp., 40 Wall St., New York.—Ed.

NITRIDING

Sir:

What can you tell us in reference to nitriding, also Nitralloy steels? Can you give us some up-to-date information?

M. C. COLE,
President & General Manager,
Southworth Machine Co.,
Portland, Maine

• During the past several years we and other technical journals have published much on this subject, but the best way to get all the data you want is to write to the Nitralloy Corp., 230 Park Ave., New York.—Ed.

ELECTRIC CUPOLAS

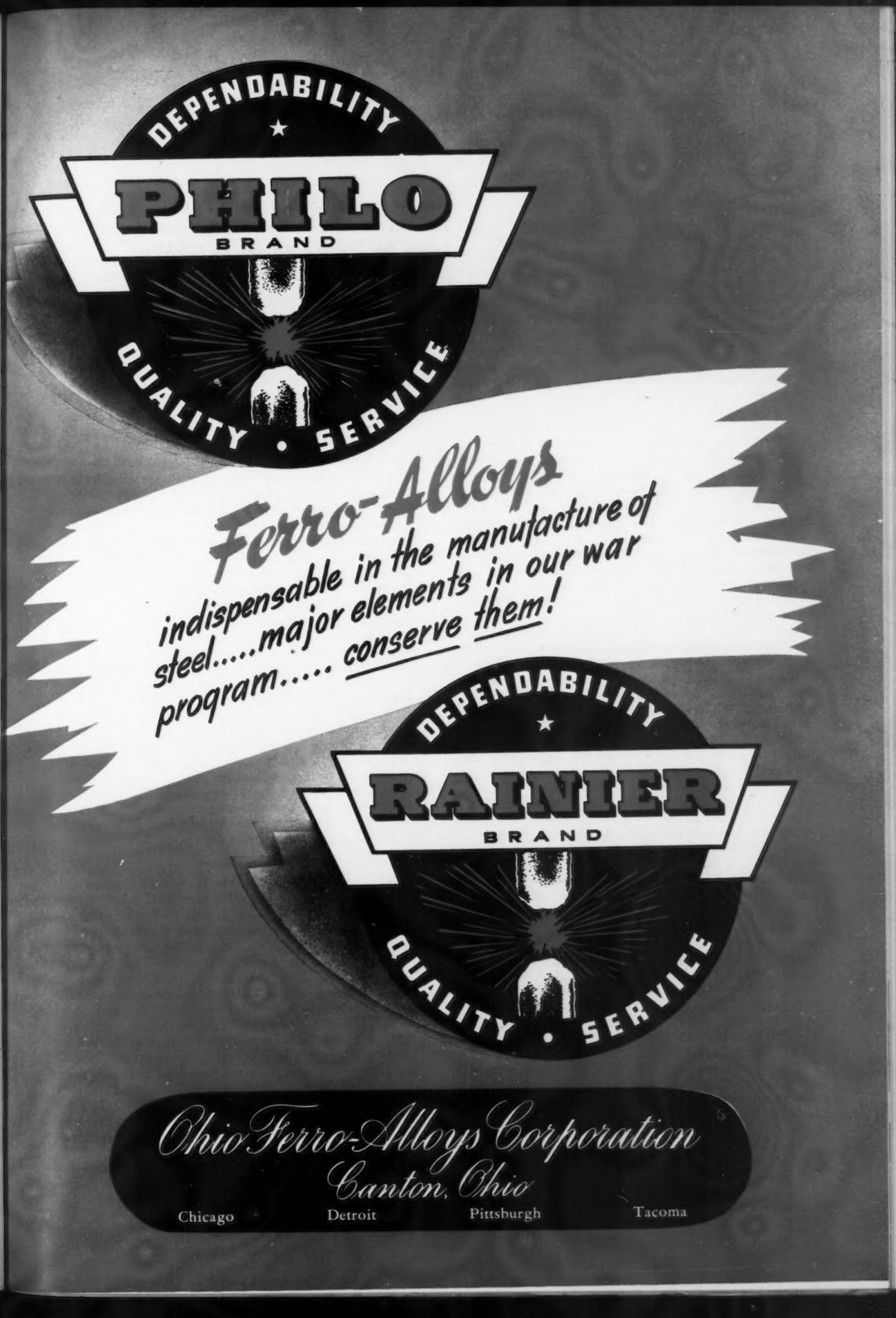
Sir:

On page 78 of the July 23, 1942, issue you mention the use of cupolas in gray iron foundries to produce metal that is usable in electric furnaces.

Where can we get information concerning this?

L. W. MILLIS,
Secretary,
Security Manufacturing Co.,
Kansas City, Mo.

• Write to Whiting Corp., Harvey, Ill. —Ed.


DEPENDABILITY
★
PHILO
BRAND
QUALITY • SERVICE
Ferro-Alloys
indispensable in the manufacture of steel.....major elements in our war program..... conserve them!
DEPENDABILITY
★
RAINIER
BRAND
QUALITY • SERVICE
Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago
Detroit
Pittsburgh
Tacoma

This Industrial Week . . .

- ***Austin Takes Steel Branch Post***
- ***Former Steel Chief Backs Budget Plan***
- ***Ingot Production Advances Slightly***
- ***Strikes Increase, Hamper War Effort***
- ***Piling, Shapes Go on Critical List***

FEW jobs in this war have a higher mortality rate than the one of running the War Production Board's Iron and Steel branch at Washington. For the man who has this post, the axes are always bright and shining. The job seems suited to those who like to live dangerously.

Latest to quit the uproar of the steel branch, and the daily wrestle to distribute steel to the right war plants at the right times to the satisfaction of the Army, Navy, Maritime Commission, WPB, Congressmen and the steel consumers themselves, is Reese H. Taylor.

While Mr. Taylor may have lost some of his faith in human nature during his term at the WPB, he did not lose his voice and he was able this week to shed some light on the questions—What's the next big change in the system of steel distribution control? Will the priority system be scrapped or has it already been scrapped? What has happened to PRP? Will the substitution of WPB specialists for Army-Navy men as issuers of priority ratings be helpful? (No one seems to be able to answer some of these questions.)

First, Mr. Taylor told THE IRON AGE that his "opinion of how WPB should distribute steel and other materials had nothing to do with my decision to resign." Earlier claims had been made that Mr. Taylor was climbing out of the Iron and Steel branch hot seat because higher WPB officials had turned down the new quota allocation system plan of steel distribution. (The fate of this new plan for war steel distribution is being awaited with concern by various people who have studied it and who believe it will work. Final decision is up to Donald Nelson.)

Mr. Taylor told THE IRON AGE that it was understood by his board of directors (Union Oil Co., California) that he was to return to California the moment he found that he could not do a good job, which implies that Taylor's authority at WPB was not commensurate with his responsibilities.

Asked if he had been critical of the entire priorities system, Mr. Taylor said that it was no secret that he is opposed to any system of distribution that did not provide for the "budgeting" of steel. "While the Production Requirements Plan may be all right for other industries, in my opinion it is not suitable for application to the steel industry," he said. "I testified before the Truman committee to this effect, and I have told them at WPB the same thing. I told them that they would meet the same problem with the double letter (AA, etc.) preference ratings."

Mr. Taylor's criticism was directed at the issuance of so many priorities for which there is no steel at the time the ratings are granted. Said the former head of the WPB's Iron and Steel Branch: "I have lots of ideas but they are not the reason for my resignation. However, if the board would approve the quota allocation system, and ask me to stay to get it started, I would agree to remain temporarily, but not more than two months."

Early this week, however, the WPB Iron and Steel Branch had a new boss. It was David F. Austin, one-time $15-a-week office boy who is a vice-president of Carnegie-Illinois Steel Corp. WPB Chairman Nelson appointed Mr. Austin as deputy chief of the Iron and Steel Branch and its acting chief until Mr. Nelson appoints a permanent WPB chief steel executive. While friends of Mr. Austin noted that he already had two and a half strikes on him on such a job, since he is from a big (the biggest) steel company, has always been in the steel business and is a salesman, they decided his danger at the WPB may be less because he is only "acting" chief of the Iron and Steel Branch.

•

IN some steel making areas there was concern this week lest changes in WPB personnel mark the beginning of an entirely new procedure for establishing the sequence of deliveries from steel plants to war and fabricating plants. With the industry only beginning to emerge from the convulsions of the PRP and Allocation Classification changeover, another change at this time would disrupt efforts at common-sense scheduling of shipments to vital war factories and shipyards. Yet such a new procedure may come.

Steps to centralize issuance of priorities in WPB's hands are taken to be a constructive step. Mr. Nelson has already set Sept. 7 as the date on which authority of the Army and Navy procurement officers to assign priority ratings in the field will end. Thereafter all contracts placed by the armed services will be rated by priorities specialists in the regional and district offices of WPB.

Some steel producers are only mildly optimistic over concentration of the power to issue ratings, the down-

grading of high priorities, and other steps taken so far to expedite steel distribution. Unless immediately successful efforts are made to solve the distribution problem, intermittent shutdowns of certain departments of war plants or of entire plants are likely to develop. Some men in industry cannot get it out of their heads that each priority rating or warrant should have a physical relationship to a certain amount of steel, and that the sum total of such warrants should equal, not exceed, the tonnage which the nation's mills can produce. This feeling is reflected in some of the provisions of the entirely new steel distribution plan which the WPB is now studying.

Various steel centers report that electric furnace alloy steels still are rated as the tightest of all steel products, followed by plates. Piling and shapes are now on the "very" critical list. Shipyard demand for plates is increasing.

Volume of incoming orders for most steel companies showed little change from July. Cancellations have increased, with one mill reporting such tonnage equalling more than 5 per cent of new orders. This is believed to be the backing up of demand resulting from the priority down-grading under PRP, and the realization by an increasing number of steel consumers that they will not be able to get steel.

•

IN order to permit an increase in steel bar tonnage, pipe output for September is likely to be lower as will be production of reinforcing bars. There are few changes in the sheet and strip allocations for this month. September plate allocation was approximately 10 per cent below the July total, making the current month the second in which plate output will have declined. Plate inventories at some shipyards and warehouses are being called on to make up the difference in plate output and demand.

Steel production this week was a shade higher, moving to 97.7 per cent, compared with 97.6 per cent last week, the gains being made chiefly in the Youngstown area, up a point to 98.5 per cent and the Philadelphia district, up a full point to 93.6 per cent. Pittsburgh ingot output gained a half point to 97.5 per cent, the Cleveland area making a similar gain to 101 per cent. Lower operations were reported by Chicago, down 1½ points to 103 per cent; Buffalo, off two points to 104½ per cent; Detroit, almost two points to 98.3 per cent; and Southern Ohio River, 4½ points to 95.6 per cent. The Wheeling-Weirton district rate is unchanged at 86 per cent and the Southern rate is holding for another week at 96.6 per cent.

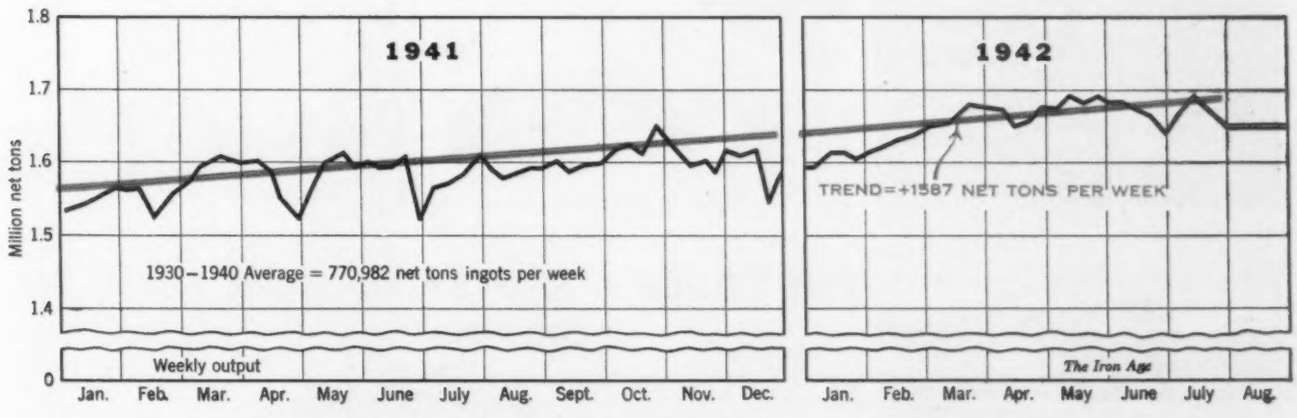
•

AS September begins, with Labor Day shutdowns likely to be set aside this year in many plants, both the scrap shortage and the spread of strikes are causing concern. Steel plant shutdowns so severe as to be damaging to the war program apparently must occur to change the government's present method of controlling scrap. This week one large steel company had turned its hundreds of salesmen loose on an iron and steel scrap hunt. Scrap supplies at several points, including Chicago and Cleveland, fell to a dangerously low point for some mills, arousing fears that open hearths would have to be dropped until government allocations of scrap can be arranged.

Strikes in war plants are momentarily increasing in number. Most employers and many labor leaders were studying the text of the War Labor Board minority report (in the U. S. Steel-USWA decision) discussing the sanctity of contracts. The steel union won a back pay increase covering a period in which a contract was in effect. Leaders of most of the current plant disputes are publicizing wartime salary increases for some industrial executives as a reason for wage demands for union members.

Turn to page 126 for summary developments on the labor front.

Early this week United Steel Workers of America and Jones & Laughlin Steel Corp. were still negotiating in an attempt to embody changes in the contract between the two parties in line with the recent "Little Steel" case. In view of the union demand for retroactive pay increases and the fact that the company already had a contract with the union during the period the retroactive clause would cover, it is believed this case, like others, will finally reach the War Labor Board.



Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
August 27	97.0	103.0	97.5*	92.8	100.5	106.5	86.0	96.6	100.3	100.0	102.0	95.0*	81.3	97.6
September 3	97.5	101.5	98.5	93.6	101.0	104.5	86.0	96.6	98.4	95.6	102.0	95.0	90.0	97.7

* Revised.

THE No. 3A Duomatic Lathe meets today's demands and needs of our armed forces for greater and greater output from turning equipment.

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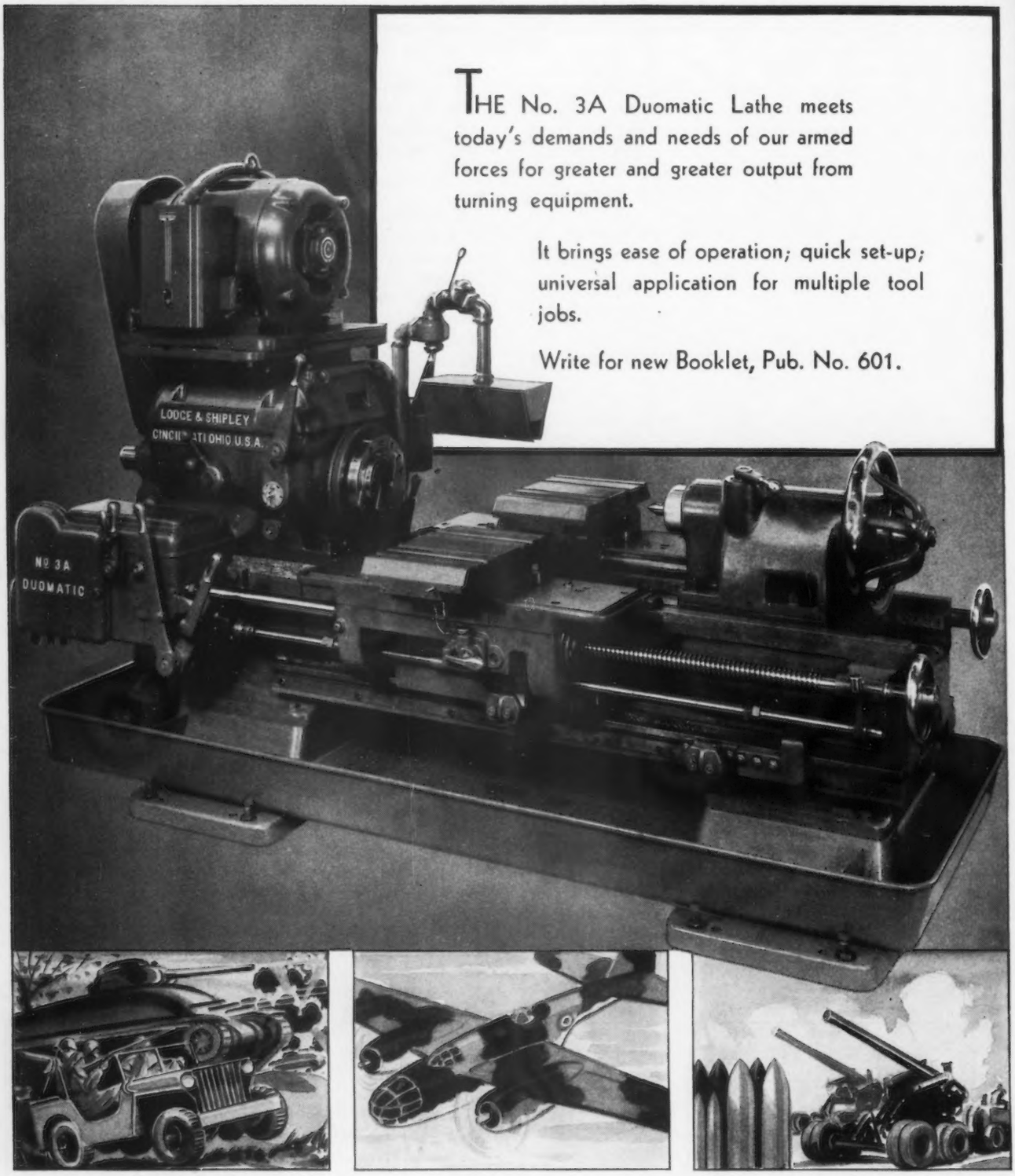

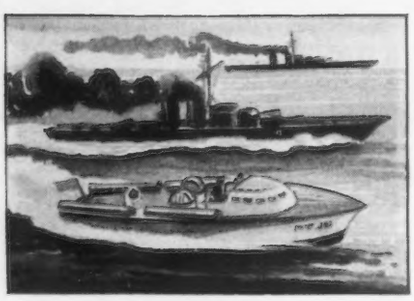

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Steel Centers Jumpy Over Resignation of Taylor from WPB Job

• • • **The resignation** of Reese Taylor, Iron and Steel Branch head, was received with dismay at important steel centers like Chicago, Pittsburgh and Youngstown. The action comes at a time when the iron and steel industry and the WPB Iron and Steel Branch under the leadership of Taylor had reached a new high in cooperation and understanding of industrial problems, it was said.

Reports reaching steel centers also indicate that the past few weeks of rumors and counter-rumors concerning personnel changes climaxed with the tendered resignations of Taylor, Allen and Houghton, have affected the morale of some WPB officials.

That Reese Taylor resigned for

News of Industry

reasons other than petty differences is well known in the various steel centers. It is believed, on good authority, that the failure of certain high WPB officials to accept a well thought out program for the production and distribution of iron and steel products was the final and determining point in Mr. Taylor's differences with his superiors. It is recalled, however, that Taylor had resigned some time ago pending naming of a successor.

A new set of rules and new faces in the WPB Iron and Steel branch at a time when maximum steel production was being directed into channels most conducive for carrying on the war would in all probability create another trial and error period.

A repetition of this would be unnecessary in view of the substantial progress having been made in recent months, most of which, it is understood, was embodied in

See page 88 for Mr. Taylor's views on steel distribution.

the new iron and steel quota production and distribution plan which early this week had not been approved by WPB brass hats, even though it had the support of not only steel companies but various governmental agencies.

Taylor, Allen and Houghton Quit WPB

Washington

• • • **Reese H. Taylor,** WPB Iron and Steel Branch Chief, and Deputy Chief R. C. Allen resigned last Thursday. Mr. Taylor said he was anxious to resume his duties as president of the Union Oil Co. of California. Mr. Allen said he resigned because Mr. Taylor had, and to give the new branch chief when he is appointed freedom to choose a deputy chief.

Donald M. Nelson, WPB chairman, told Mr. Taylor he would have arrangements made for a choice of Mr. Taylor's successor some time this week, in yielding finally to Mr. Taylor's many requests to be relieved of his duties. Mr. Taylor, who joined WPB May 25, said his first resignation in writing had been submitted to Mr. Nelson on June 24, but he had asked Mr. Nelson verbally for permission to return to industry several times prior to this.

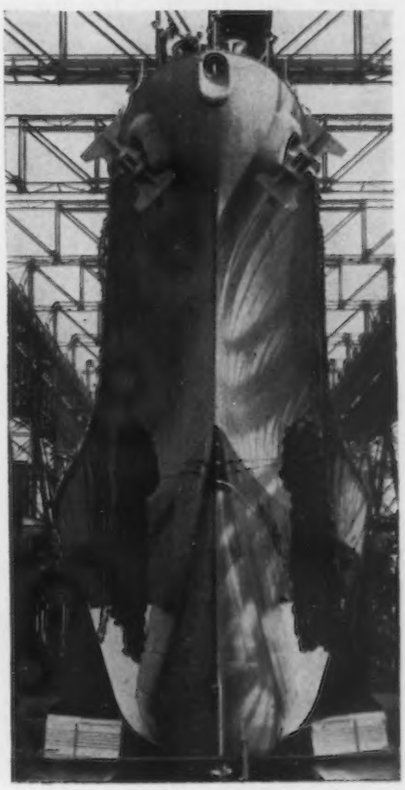
When he took the job, Mr. Taylor pointed out, it was mutually understood by WPB and the Union Oil Co. board of directors that Mr. Taylor's tenure was to be of a temporary character, to be terminated as soon as possible.

Coming upon the heels of Mr. Taylor's and Mr. Allen's resignations was that of Amory Houghton, WPB director general for operations. Mr. Houghton, like Mr. Taylor, was a $1 a year man.

200,000 MILE RETREADS: Measuring the flange angle of a freight car wheel in preparation for a weld retread. Worn wheels are reconditioned by building up the flange with weld metal and turning to match its mate in a new process developed by the Atlantic Coast Line Railroad.

BIGGEST, PERHAPS LAST: The U.S.S. Iowa, largest battleship ever built in the United States, slides down the ways at its launching in the Brooklyn Navy Yard, Aug. 27. The 45,000 ton, super-dreadnaught of the sea was named by Mrs. Ilo Browne Wallace, wife of the Vice President. Armament is said to include 16 in. and 5 in. guns as well as several hundred anti-aircraft guns. The ship is 880 ft. long.

Harris & Ewing



In his letter of resignation to Chairman Nelson, Mr. Houghton said he wanted to save Mr. Nelson from any embarrassment that might result from conviction of the Corning Glass Works on an anti-trust charge. Mr. Houghton is chairman of the Corning board and said that the company's directors were insistent that he return to participate in new decisions confronting the business. Mr. Houghton's resignation was accepted, effective Sept. 15.

Sponge Iron Plant for O'Mahoney's Wyoming

Washington

• • • **The commercial-size** pilot plant for the production of sponge iron, to be built by the Bureau of Mines under a recent authorization by Congress, will be located at Laramie, Wyo., on a site made available to the government, it was announced last week by the office of Secretary of the Interior Harold L. Ickes.

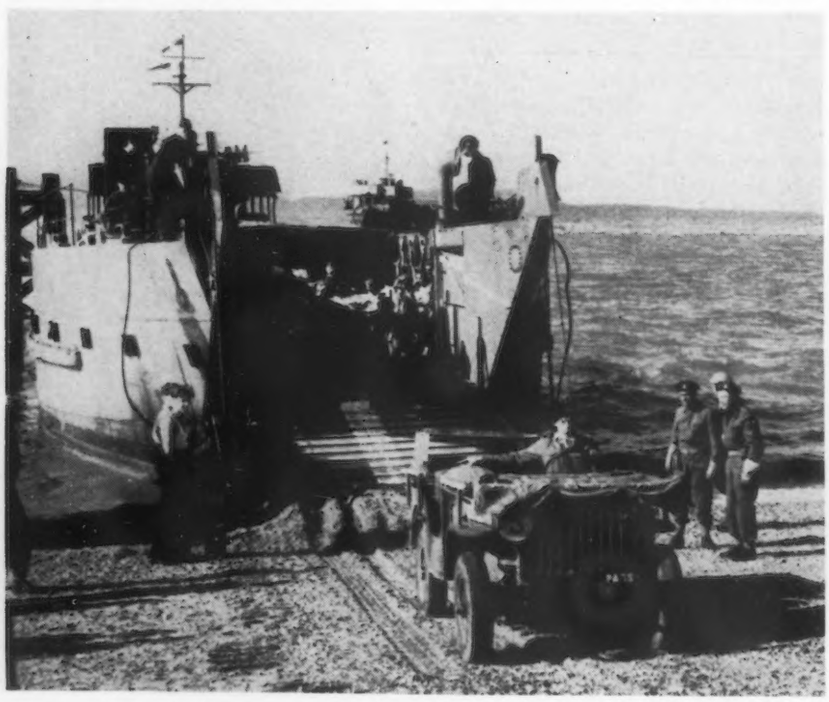
This location was chosen, it was stated, mainly because of its nearness to available sources of iron ore, natural gas, and coal—the three chief materials needed to produce the porous and granular metal on the basis of its studies to date. The Bureau of Mines has concluded that sponge iron can be utilized as a suitable substitute for scrap iron to mix with ordinary pig iron in manufacturing steel.

While the construction of the pilot plant is progressing, the Bureau of Mines will make a thorough investigation of various processes for producing sponge iron in small-scale pilot plants which are owned by private companies, the Secretary stated. Arrangements are being made for the Bureau to operate and experiment in these small plants.

Three of the processes to be investigated by the Bureau in the private plants are reported to have produced sponge iron successfully on a pilot plant scale. One of the private companies producing a similar material is known to have been in continuous production 24 hr. a day for more than a year; and another successfully designed a 500-ton plant in Japan several years ago. The Bureau of Mines will incorporate the best features of the private plants into the new government operation in Wyoming.

The new commercial-size pilot plant will use both natural gas and solid fuels, it was stated, so that the method best for particular regions may be readily adopted.

SAFE FROM DIEPPE: This invasion barge, which participated in the raid on Dieppe, carried Bren gun carriers which were landed over this unloading platform in rapid succession. The barge is shown landing fighting Britons safe again on English soil. *Press Assoc., Inc.*



Frick Development to Yield 6,000,000 Tons of Coal a Year

Pittsburgh

• • • **New coal mining facilities** being developed by H. C. Frick Coke Co. in Greene County, Pa., are expected to produce eventually six million tons of coal a year, replacing production lost through the exhaustion of other coal fields, according to Harry M. Moses, president.

The output of this development will be important from the standpoint of pig iron production since the coal is shipped to beehive ovens.

New Book on Plastics Is Written by G.-E. Engineer

• • • **A new book, "Plastics,"** by J. H. DuBois, has just been published by the American Technical Society, Chicago. Mr. DuBois is a sales engineer in the General Electric Plastics Department, employed at the Fort Wayne, Ind., factory.

The book begins with a general introduction to plastics, defining fundamentals and terminology. The author then takes up the various types of materials separately, indicating their sources, manufacture, variations, properties, and applications. Copies are available from the American Technical Society, 850 East 58th St., Chicago, Ill., at $3 per copy.

Canada Orders Permits On New Items for Export

Ottawa, Canada

• • • **Canada's Trade Commissioner MacKinnon** announced that on and after Sept. 2 an export permit will be required before the export to any destination of agricultural implements and machinery parts valued in excess of $25, and also for all export of cartridges of 22-cal. and lighter. The new order is for the purpose of conserving Canadian steel supplies and materials for war.

Hot Dip Galvanizers to Meet

• • • **The semi-annual** meeting of the American Hot Dip Galvanizers' Association, Inc., will be held Sept. 17 at Hotel Statler, Cleveland. All speakers will deal specifically with technical and practical phases of the industry.

Palmed Off Salesmen?

Washington

• • • **By definition,** the principal function of WPB is distribution of material, as WPB spokesmen are wont to say. Moreover these spokesmen say it is evident that Messrs. Truman and Libbey (critics of steel men in the WPB) are not aware that those same "broken down" and "palmed off" steel "salesmen" in the WPB Iron and Steel Branch are engaged in a familiar occupation in distributing and scheduling steel products—doing the same job for the government which they did for the companies for whom they previously worked.

However, not all of the principal employees in the WPB Iron and Steel Branch are salesmen. Many are top ranking operation and technical men as well, so that the Truman-Libbey charge becomes a little foolish sounding in the face of facts, it is thought by observers here.

For a discussion of complaints against the WPB Iron and Steel Branch, see page 87 in last week's IRON AGE.

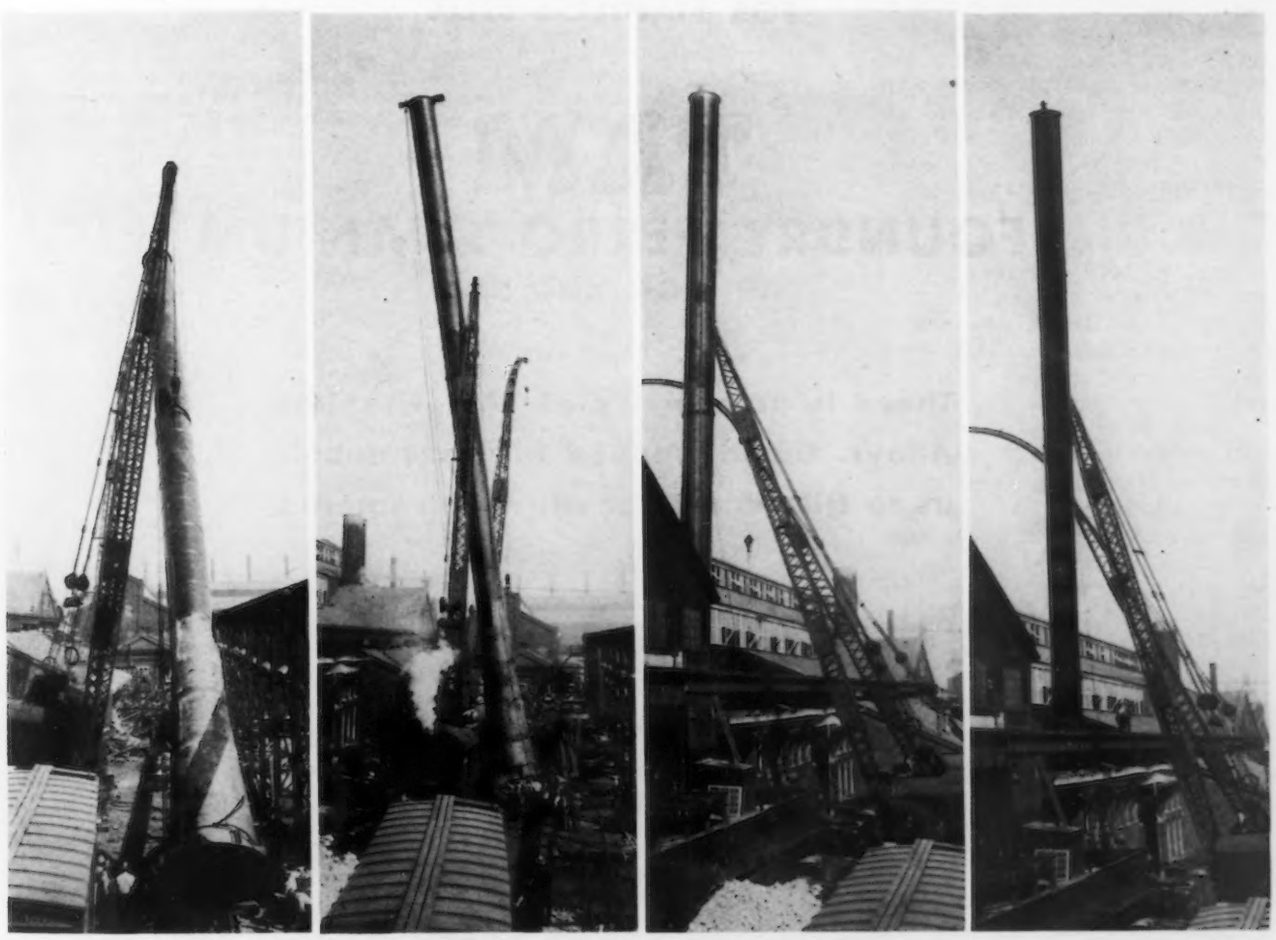
Men cannot spend from 35 to 40 years in the steel industry and not know a little about it, is the thought of high WPB officials, who resent the slander of their judgment in hiring men from the industry.

Sketches of a number of the WPB Iron and Steel Branch men follow:

David F. Austin—Executive consultant to Iron and Steel Branch Chief, Reese H. Taylor. Mr. Austin is vice-president and director of the Carnegie-Illinois Steel Corp., in charge of sales, solicitation, distribution, advertising, market analysis and research, and sales promotion. Mr. Austin

A MONTH'S WORK IN FIVE DAYS: In less than five days, workmen at the Gary, Ind., plant of Carnegie-Illinois Steel Corp., assembled and erected this 16-ton, 125-ft. open hearth stack to replace one blown down during a windstorm. This job would normally have taken a month, but to avoid keeping the steel foundry down any longer than necessary, the steel corporation engineers devised shortcuts and worked overtime to remove the damage caused by the old stack when it collapsed and to erect the new one in less than five days. The above photos show the final steps in setting up the new stack. The new stack was hauled in sections by truck from the corporation's Joliet plant and assembled at Gary. Three foundry employees were killed when the old stack crashed through the steel foundry roof.

Courtesy Chicago Herald-American



1.15 P.M. 2.30 P.M. 3.30 P.M. 4.00 P.M.

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TAM
(F.C.T.) FERRO-CARBON-TITANIUM
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has spent 22 years in the industry. He started his career as an office boy at $60 a month, and successively held various sales positions until he took his present office in 1938.

Orin Baker—Rail Unit Chief. Mr. Baker is manager of the Railroad Division of the Chicago area for Carnegie-Illinois and has served with the company for 35 years, working in nearly all operating departments.

Joseph L. Block—Executive consultant to Mr. Taylor. Executive vice-president of the Inland Steel Co., Mr. Block has worked in steel for 20 years. For more than 50 years the Block family has been identified with the industry.

Norman W. Foy—Executive consultant. From 1912 to 1942 Mr. Foy has been employed by Republic Steel Corp. He is general manager in charge of sales.

Harry M. Francis—Wire Unit Chief. Though now vice-president in charge of sales of the American Steel and Wire Co., Mr. Francis has held various positions in this company since 1915.

H. J. French, Technical Consultant, was a metallurgist with the International Nickel Co. for a number of years. He was graduated from the Columbia School of Mines, and worked for about 10 years at the National Bureau of Standards.

A. Oram Fulton—Alloy Unit Chief. Mr. Fulton at one time in charge of the Winchester Repeating Arms Co., Heat Treating Department, is president of the Wheelock-Lovejoy Corp. Since 1910, he has been active in this country in the sale and distribution of alloy steel.

George G. Gries—Executive Consultant. Since 1930 Mr. Gries has been vice-president of the Great Lakes Steel Corp. He has been associated with the industry for 35 years, and his first job was in the chemical and metallurgical department of the Illinois Steel Co. In the intervening years, Mr. Gries worked in sales capacity for the LaSalle Steel Corp., Central Steel Corp., and Central Alloy Steel Corp.

George Hocker — Casting and Forging Unit Chief. Mr. Hocker has for many years been manager of the forging and casting sales for the Bethlehem Steel Co. He is considered to be a recognized authority in his field.

Jesse Honeycutt — Executive consultant, and vice-president of the Bethlehem Steel Co. Mr. Honeycutt is familiar with both production and sales, having come up through operating departments in keeping with Bethlehem policy.

Arthur J. O'Leary — Assistant Chief, Allocation Unit. Mr. O'Leary's experience likewise runs from operations to sales. He is assistant sales manager for the Lukens Steel Co., but began his career as a production clerk in the Alan Wood Steel Co., in 1916. He has been successively provider, chief operating clerk, stocking and providing clerk.

Richard F. Sentner—Tin-Plate Unit Chief. He is the manager of the tin plate sales division of the Wheeling Steel Corp. and has worked in the industry since 1923.

William F. Vosmer—Hot Rolled Bar and Semi-finished Unit Chief. Mr. Vosmer is sales manager of the Bar Division of the Republic Steel Corp. and has been connected with the industry since 1903.

Charles H. Longfield—Executive Consultant. Mr. Longfield has been vice-president of the Youngstown Sheet & Tube Co. since 1932. Before he was with the Youngstown Sheet & Tube Co. he worked for the Lamson-Sessions Co., manufacturers of bolts and nuts. His experience includes both production and sales.

Arthur V. Wiebel — Executive Consultant. Mr. Wiebel is assistant to the vice-president in charge of engineering of the United States Steel Corp. He has worked for the corporation or its subsidiaries since 1933, and has been in charge of design, operations, capacity, production methods, etc.

Ralph L. Wilson—Metallurgist. Mr. Wilson majored in electrometallurgy at Lehigh University, and has worked in the metallurgical departments of the United Alloy Steel Corp., Central Alloy Corp., Timken Roller Bearing Co., and is now a metallurgical engineer for the Climax Molybdenum Co.

LIMITED LEBENSRAUM: Borrowing the Nazi term, "lebensraum," aptly describes what seems to be needed on this U.S. aircraft carrier. Actually, this apparent crowding is not unusual as scout planes and dive bombers are spotted on the flight deck ready for immediate take-off in rapid succession. Here they are refueled, rearmed and otherwise made ready for instant service.

Official U. S. Navy Photo, International News

How You Can Simplify Your Scrap Disposal

The sale of iron and steel scrap should be —and can be—as satisfactory and pleasant as any business transaction in your plant.

Deal through a scrap broker in whom you have complete confidence.

In nearly half a century of scrap trading we have built on high standards of SERVICE, TRUSTWORTHINESS and RESPONSIBILITY.

We guarantee that EXTRA SERVICE which will give you the greatest possible monetary return and the least amount of trouble.

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Oliver Bldg.
Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

Howard J. Barber—Sheet and Strip Unit. Mr. Barber was formerly with the Andrews Steel Co., Newport, Ky., in a production capacity.

Alan F. Danzer—Scrap Unit. Since 1919 Mr. Danzer has been employed in iron and steel and metal working industries. His previous connection before coming to the WPB Iron and Steel Branch was with the Great Lakes Steel Corp., Ecorse, Mich., in the purchasing department. Mr. Danzer's former employers include the Ford Motor Co., Rotary Electric Co., and the Murray Corp. His job with Murray was general superintendent of its material division.

Tecumseh S. Fitch—Hot Rolled Alloy Unit. A production engineer, and a direct descendant of General W. T. Sherman, Mr. Fitch's last employment in this capacity was with the Jessop Steel Co., Washington, Pa.

Walter G. Flood—Plant Facilities Unit, Repair Orders. Mr. Flood is assistant to the president of the Barium Stainless Steel Co., Canton, Ohio. Mr. Flood is a metallurgist and has had 25 years experience in the industry, which has included both production and sales positions. He was employed as chemist with the National Tube Co., and in the sales department of the Bethlehem Steel Co.

Karl M. Hamilton — Forgings and Castings Unit. The Bettendorf Co. of Bettendorf, Iowa, is Mr. Hamilton's home company where he worked in sales engineering. For 37 years in positions closely connected with the industry, Mr. Hamilton has been employed by such firms as the American Car & Foundry Co., and the Malleable Iron Co.

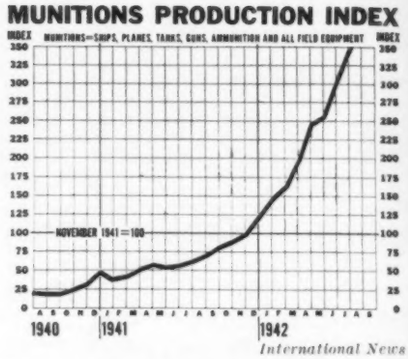
A. Douglas Hannah—Pig Iron Unit. Before coming to Washington, Mr. Hannah worked in the sales department of the Pittsburgh Coke & Iron Co., Pittsburgh.

J. W. Hargate—Scrap Unit. Mr. Hargate has been with the Granite City Steel Co., Granite City, Ill., since 1907, and his last work was in the company's purchasing division.

Harry E. Hartman—Wire Unit, vice-president and general sales manager of the Indiana Steel & Wire Co., of Muncie, Ind. Mr. Hartman is well known and has had extensive industry experience.

Edward D. Jenkins—Available Stocks Unit. Mr. Jenkins went to the branch from Joseph T. Ryerson & Son, prominent steel warehousemen.

MUNITIONS PRODUCTION INDEX



International News

NELSON'S MUNITION REPORT: Donald M. Nelson used this chart on Aug. 22 in reporting that munitions output has increased three and one half times since the month before Pearl Harbor. Even this was reported as being seven per cent behind expectations.

Irving H. Kulp—Plate and Shape Unit. The sales department of the Colorado Fuel & Iron Corp., Lincoln, Neb., was Mr. Kulp's last position in private industry.

Homer F. Ludwig—Plant Facilities Construction Unit. Mr. Ludwig was previously connected in a production job with the Wheeling Steel Corp.

R. G. McElwee—Scrap Unit. A foundry engineer Mr. McElwee was until recently with the Vanadium Corp. of America. He was at one time general manager of the Ecorse Foundry. The Muncie Foundry also employed Mr. McElwee.

A. A. Ohmer—Forgings and Castings Unit. Mr. Ohmer's steel background includes 27 years in the industry. His last job in private industry was with the Erie Forge Co., Erie, Pa., where he was a member of the sales staff.

Ralph J. Stayman—Chief, Distressed Stock Unit. More than 42 years in the steel industry is Mr. Stayman's record. He is warehouse manager for Carnegie-Illinois Steel Corp., and has held this position with Jos. T. Ryerson & Sons, Inc., and the Jones & Laughlin Steel Corp.

Frank E. Vigor—Chief Raw Material Unit. Mr. Vigor is general transportation manager of the American Rolling Mill Co., and has been with this company for 32 years. He is in charge of coal mining, ore and coke control, and river steamers, and traffic.

SUPER-CYCLONE PERFORMANCE SHEET NO. 57

COMPANY [redacted] CITY [redacted]

STREET [redacted]

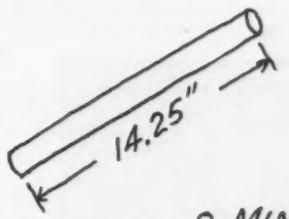
EQUIPMENT

TYPE OF FURNACE 3336-GHV SERIAL NO. H-4294

FLOOR SPACE 80"x 110" (61.1 SQUARE FEET)

CHARGE

[DIMENSIONS, SKETCH AND DESCRIPTION OF PART]



WEIGHT OF PART 4.5 LBS.

NO. OF PIECES 328

THICKEST SECTION 1 1/8"

TYPE OF METAL ND-3250

CHARGE GROSS LBS. 1876

CHARGE NET LBS. 1476

WEIGHT OF FIXTURE 200 (2)

HANDLING TIME (LOADING) 18 MIN. (UNLOADING) 8 MIN.

HEAT TREATMENT

PROCESS HARDENING TEMPERATURE 1525° F.

TIME IN FURNACE 1 HR.-45 MIN. TIME TO REACH HEAT 45 MIN.

TYPE OF QUENCH OIL TANK SIZE 5'DIA-6'DP. GALS. PER MIN. 1100 QUENCH 50 COOLING

DISTORTION 90%-.002"-.003" 10%-.010" MAX. HARDNESS BEFORE TEMPER 56-58 R.C. AFTER 37-39 R.C.

TEMPERING

FURNACE 2536-GH SERIAL NO. T-4295 TEMPERATURE 950° F.

TIME IN FURNACE 80 MIN. TIME TO REACH HEAT 20 MIN.

PREVIOUS METHOD OF HANDLING NONE

FURNACE SERIAL NO. TEMPERATURE

TIME IN FURNACE TIME TO REACH HEAT

HANDLING TIME (LOADING) (UNLOADING)

DISTORTION FLOOR SPACE

DATE 8-10-42 INVESTIGATOR R. S. AITCHISON

Get first hand information on the Super-Cyclone at the Lindberg booth — National Metals Congress — Cleveland — October 12 to 16

CYCLONE FOR LOW-COST ACCURATE TEMPERING

SUPER-CYCLONE FOR HARDENING, ANNEALING, NORMALIZING, TEMPERING, NITRIDING

HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

House Group Hunts Black Market; Truman Probe To Be Resumed

Washington

• • • **The battle of steel** is raging on the home front. Firing and cross-firing come from various directions.

A House subcommittee of the Committee on Merchant Marine and Fisheries, apparently skeptical that there is a shortage of steel, is probing into a so-called "black market" in warehouse steel. It is seeking to find how extensive this alleged market may be and whether or not it is a partial clue to lack of steel. This contrasts with a more generally accepted view that the difficulty lies in faulty distribution and the piling up of excessive inventories by certain users.

As the House committee was dragging along with its investigation last Thursday of the Maritime Commission's cancellation in July of its contract with the Higgins Shipbuilding Corp., New Orleans, for construction of 200 Liberty cargo ships, word came that Federal Judge Robert N. Wilkin in Cleveland, responding to OPA "black market" charges had issued a temporary injunction against Henry J. Kaiser's West Coast shipbuilding plant and the Builders' Structural Steel Co., Cleveland warehouse operator. It was alleged that the Kaiser concern had bought steel from the warehouse at "profiteer prices" in violation of OPA celings. OPA Attorney Gruener said that the President had asked for an investigation into the black market for steel, and that Price Administrator Henderson had given instructions to "pull no punches." Mr. Kaiser declared that the charges might be "an attempt to besmirch a legitimate concern earnestly engaged in the prosecution of the war effort."

Previously, OPA obtained a decree at Cleveland, permanently restraining Willard P. Markle, Houston, Tex., steel warehouseman, from violating OPA prices. Attorney Gruener stated that investigation of the Markle firm's activities had led to the issuance of the court writ against the Kaiser company, and had followed the declaration by Frank Higgins, son of the president of the Higgins company, that a black market existed in steel. The House committee expects to resume hearings this week.

Meanwhile, the Truman Senate Subcommittee, investigating national defense, also is about to again take up its inquiry into the steel situation. Unlike the House committee, the Senate committee is proceeding on the premise of a steel shortage, and is promoting the idea of western Senators for the wholesale construction of sponge iron plants to make scrap from western ores. That Secretary of the Interior Ickes is giving realistic backing to the project was shown in an announcement he made last Friday through the Office of War Information. Mr. Ickes said that the commercial size pilot plant for the production of sponge iron, to be built by the Bureau of Mines under a recent authorization by Congress, will be

THE ABRASIVE No. M3 Surface Grinder with *Motorized Spindle*

The ABRASIVE M3 Grinder with Motorized Spindle was devised at the request of several customers and combines the advantages of two Abrasive Grinders. Reorders from these customers made it seem wise to add the M3 to our regular line of grinders. The machine itself is the popular No. 3B with full automatic feeds, a fast, accurate, carefully designed machine. The motorized spindle is similar in design and construction to that used so successfully on the No. 1½ hand operated grinder.

The M3 delivers full motor power to the wheel, without vibration, by using a well balanced motor, with the rotor mounted directly on the wheel spindle, eliminating belts, chains, and sprockets. The wheel spindle can be of either the ball or plain bearing type. Longitudinal and transverse feeds are driven by a separate ½ h.p. motor in the base of the machine.

BETTER DELIVERY ON THE M3

Delivery on the M3 Surface Grinder is today months in advance of the 3B due to the fact that this is the first public announcement of this machine.

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located at Laramie, Wyo., on a site made available to the government. Wyoming is the home State of Senator Joseph C. O'Mahoney, who has led the campaign for wide-scale production of sponge iron, despite the contention of high ranking metallurgists that the process is impractical for volume output.

At WPB, there were resignations in the Iron and Steel Branch, including that of its chief, Reese H. Taylor. Although Mr. Taylor was not a target for its fire, WPB's Labor Division has loudly clamored in echo of AFL-CIO demands for a "greater voice" by labor in WPB, and in management of the steel industry itself. At the same time, WPB taking a tighter control of steel allocations has officially announced that it will exercise authority to assign preference ratings to individual Army and Navy contracts. Charges have been freely made that the Army and the Navy have been pushing WPB around. Claim has been made that their demands for high preference ratings have resulted in their getting excess supplies, leaving some contractors short of material and developing an unbalanced supply of steel.

A highlight of the House committee hearing last week was a disclaimer by Hector J. Dowd, WPB investigator, that he was responsible for a WPB press release of Aug. 17 covering his report on charges of a black market in warehouse steel. The release said "no evidence was developed to show directly that steel products had been shipped to the Higgins company in violation of WPB orders."

Mr. Dowd told the committee that his report was not an attempt to whitewash the WPB. On the contrary, he declared, he was "convinced there are evasions of WPB regulations." Actually, the press release said the same thing since it pointed out that "there is evidence that some steel warehouses in addition to the 22 penalized last spring, in other cases, may have violated WPB quota regulations." The inference was that there was not evidence of widespread violations.

The Committee was informed by Mr. Dowd that his report was merely preliminary and intended to be only a "springboard" for the actual beginning of investigations

"Warn't doin' anythin' wrong—jes tryin' to make some rubber."

P-10-42X

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Strong, accurate, uniform and completely dependable, HOLTITE fastenings and parts, regular and Special, are precision-made to aviation requirements and government specifications. On your next order specify HOLTITE time-saving, rugged fastenings.

Our Engineering and Technical Staffs invite inquiries on all fastening problems.

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Used to Build -

BOATS
BOMBERS • BASES

WE ARE ON A 100% WAR PRODUCTION SCHEDULE With Almost a Century of Experience Back of Us.

CLARK BROS BOLT CO.
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which are under way. His report, with which Chairman Peterson of the committee, said the committee had "no quarrel" declared that there are "three types of possible violations which may be developed as the result of the investigation now being undertaken by the Compliance Branch." These were listed as (1) warehouses receiving steel in excess of WPB quotas, (2) shipments of greater-than-carlots in "split purchase orders" and (3) steel mills showing preference for warehouse deliveries.

WPB Attorney George Letchworth expressed the opinion to the committee that the practice of breaking down large steel orders from warehouses into less-than-carloads to avoid WPB regulations was a violation. The committee claims to have evidence of this practice. Chairman Peterson, Democrat of Florida, said that the practice is widespread, and had accused the WPB of "whitewashing itself" in its own investigation.

Mr. Taylor told the committee that the WPB Iron and Steel Branch had found a few instances of warehouses getting more than their quotas of steel, but he pointed out that this did not necessarily mean purposeful violation of regulations.

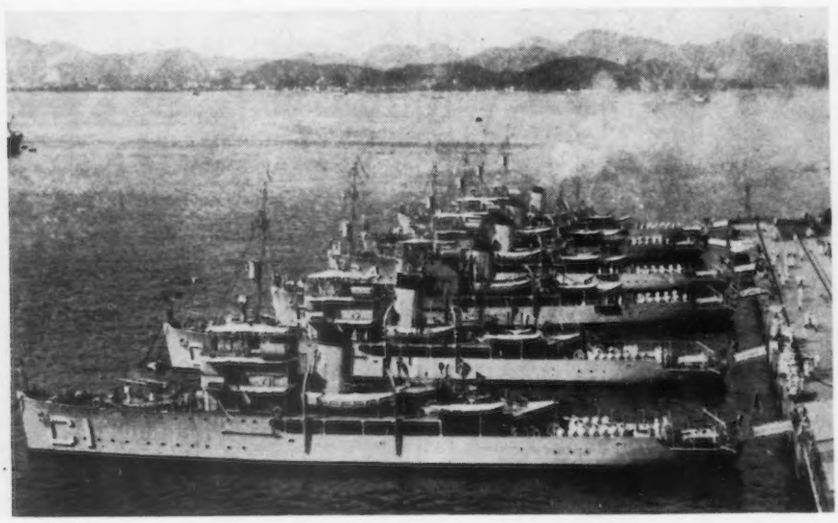
"Only if it continues, do we conclude that it is something more than a mistake," Mr. Taylor said.

Previously Mr. Taylor, in discussing plate allocations, denied that the "Navy got all the steel it wanted, the Army got most of what it wanted, and the Maritime Commission was relegated to an inferior position." This observation was made in connection with a question relating to concellation of the Higgins Contract which the commission attributed to a shortage of steel. It grew out of a statement to the committee by M. W. Cole, head of WPB's Plate and Shape Unit, that plate production had more than doubled in less than a year. Mr. Taylor submitted figures on plate deliveries since April, showing that the Maritime Commission each month received practically all of the steel allocated to it by the WPB Requirements Committee, and exceeded needs in some months.

Mr. Cole said that plate output has been steadily rising since last March, but that, pending production from new furnaces and mills next year, little additional increase is in prospect. Asked how cancellation of the Higgins contract could be justified in view of the rise in steel plate production, Mr. Cole said that he would not attempt to justify the action "without looking at the over-all picture, including increased demands from other agencies."

Estimates of the total commitments by the Maritime Commission on the Higgins contracts were placed between $28,000,000 and $29,000,000, "much of which is in the course of being canceled or

NEW ANTI - AXIS DEFENSE: These Brazilian mine layers, shown riding at anchor, are new anti-Axis defense in more ways than one. Built recently they represent modern equipment and their recent enlistment against the Axis is also only a few days old.



Heat Treatments MUST HIT THE MARK TOO!

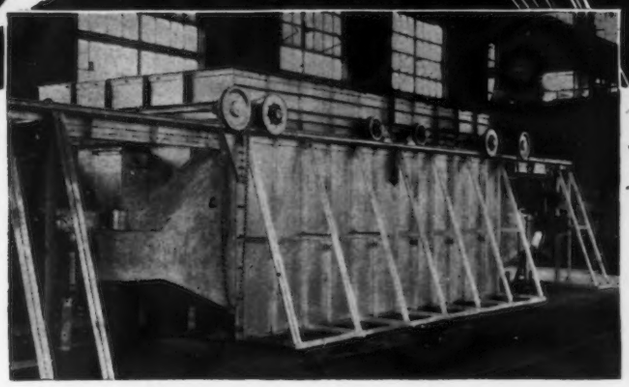
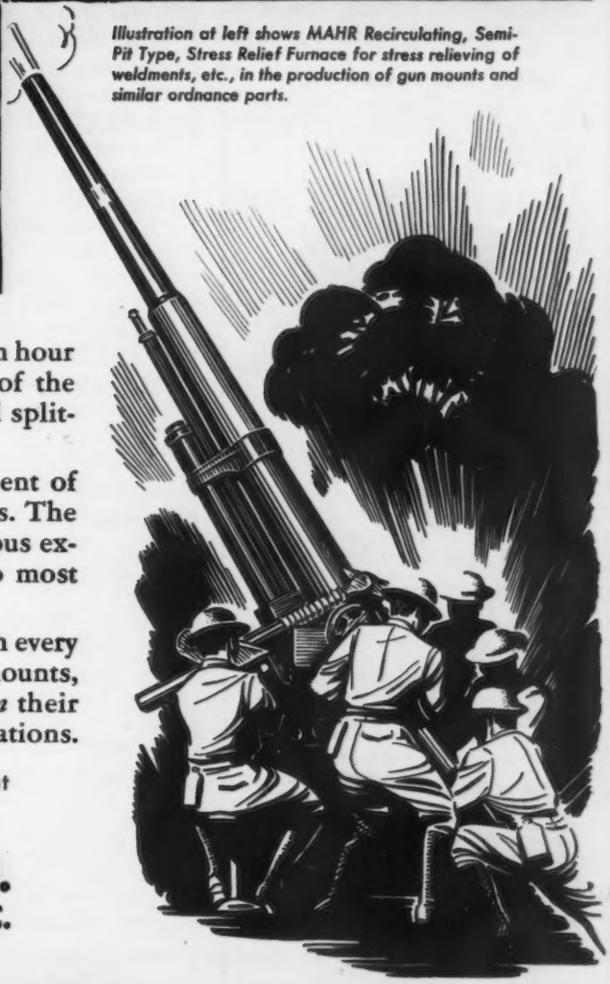


Illustration at left shows MAHR Recirculating, Semi-Pit Type, Stress Relief Furnace for stress relieving of weldments, etc., in the production of gun mounts and similar ordnance parts.



RAIDERS! Two or three miles up—flying 300 miles an hour or better! Knocking bomber or fighter planes out of the sky requires the utmost in precision manufacture and split-second aiming of the "ack-acks".

Obvious indeed is the need for accurate heat treatment of the exact type needed for gun barrels and gun mounts. The barrels must withstand the intense heat and tremendous explosive power of rapid firing. Mounts are subject to most violent strains and vibrations.

MAHR Furnaces are successfully "hitting the mark" with every type of heat treatment needed for gun barrels and mounts, planes, tanks, warships. MAHR Furnaces have *proven* their merit in thousands of wartime and peacetime applications.

A MAHR ENGINEER CAN HELP YOU on *any* heat treating problem . . . Write, wire or phone today.

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A Battery of MAHR Car Type Furnaces, made in double and single end type for normalizing and annealing of gun barrels—90 mm. to 155 mm.

FOR EVERY HEAT TREATING NEED

	Furnace Types:	*Other MAHR Equipment:*
ANNEALING	CAR BOTTOM	RIVET FORGES
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FORGING	CONTINUOUS	VALVES
DRAWING	POT	SMITHING FORGES
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MAHR FURNACES

Throw your "SCRAP" into the fight — NOW!

Expand Storage Facilities . . . Overnight!

With the Stackbin System's portable units you can expand storage facilities and speed up the flow of parts and materials . . . overnight—as many plants flooded with war orders have already done!

Stackbin units fit into any slot—in stockrooms, under benches, near machines. Can be placed within easy reach of assemblymen. They save production time because parts can be found at once without piling and unpiling boxes; because parts do not need to be transferred from bin to tote pan and back to bin again. Get complete details! Write for "LOWER COST STORAGE AND HANDLING". Stackbin Corp., 89 Troy St., Providence, R. I.

IDEAL STOCKROOM UNIT

Is this combination of Stackbins-in-Stackracks. Parts and materials are transferred from one department to another, are used or processed and passed along in their storage container. No waste time—less loss, less damage.

STACKBINS are individual hopper - fronted storage bins — with perfectly smooth interiors — which nest to form work units and slide in Stackracks like drawers for storage.

STACKRACKS are individual racks of heavy steel—made in any size you need. Locking together without tools, they make a strong, rigid storage rack of any capacity, height or shape you want.

AS FLEXIBLE, EASY TO ASSEMBLE as sectional bookcases, nested Stackbin sections provide temporary storage space wherever needed. Many modern plants use them as room or departmental storage "depots."

SLOPING FLOORS permit Stackbin Assembly Bins to feed parts continuously towards the front of the bin. Tapered front design provides semi-circular set-up, so that all parts are within easy reach.

All units in the Stackbin System are constructed of heavy steel — welded for permanent rigidity.

STACKBIN

STACKED AND STILL ACCESSIBLE

SYSTEM

STACKBIN CORPORATION
89 Troy St., Providence, R. I.

deflected elsewhere" by R. E. Anderson, the commission's finance director. When canceled, he told the committee, close to $90,000,000 represented the total cost of the Higgins contract.

Assuming full responsibility for cancellation of the Higgins contract, Rear Admiral Howard L. Vickery, of the Maritime Commission, said that the action was taken after it became evident that steel would not be available to reach a goal of 29,000,000 tons of shipping in 1942 and 1943. The Higgins yard, the Admiral declared, would be the last to go into production and had more unspent money. Existing yards, he added, had increased their rate of production so that they could make use of all available shipbuilding steel and achieve the tapered down program of 24,000,000 tons of shipping.

WPB Vice-Chairman William L. Batt, who had testified at a closed session before the committee, was urged by the committee to find some way to use the Higgins plant and "salvage the government's investment.

Michigan Payrolls Gain Rapidly in July over June

Lansing, Mich.

• • • **Figures on employment** compiled by the Michigan State Department of Labor and Industry show that payrolls increased in July at a more rapid rate than the June increases over May.

Employment advanced 4.4 per cent, payrolls 3.8 per cent and manhours 3.7 per cent. For durable goods factories alone the figures were 4.1 per cent, 3.7 per cent and 3.0 per cent.

It was stated that the automobile industry was utilizing only two-thirds of its July, 1941, labor force. Auto parts plants were said to be down 10 per cent.

Average weekly earnings in the durable goods group averaged $50.91. It was said that Michigan workers as a whole were putting in well over 40 hr. a week, and that the durable goods factory employees were averaging 45 hr. a week.

Industrial accidents during July totaled 2793, as compared with 2579 in June and 2377 in May. The July total was the highest since September, 1941.

GOB STINGER: This captured Jap machine gun, now resting safely in the hands of a U. S. sailor, was recovered from a plane shot down at Pearl Harbor. In Jap hands it might well be a "stinger" for some unwary gob or commando.

Harris & Ewing

Continental Motors Wins Praise for Its War Effort

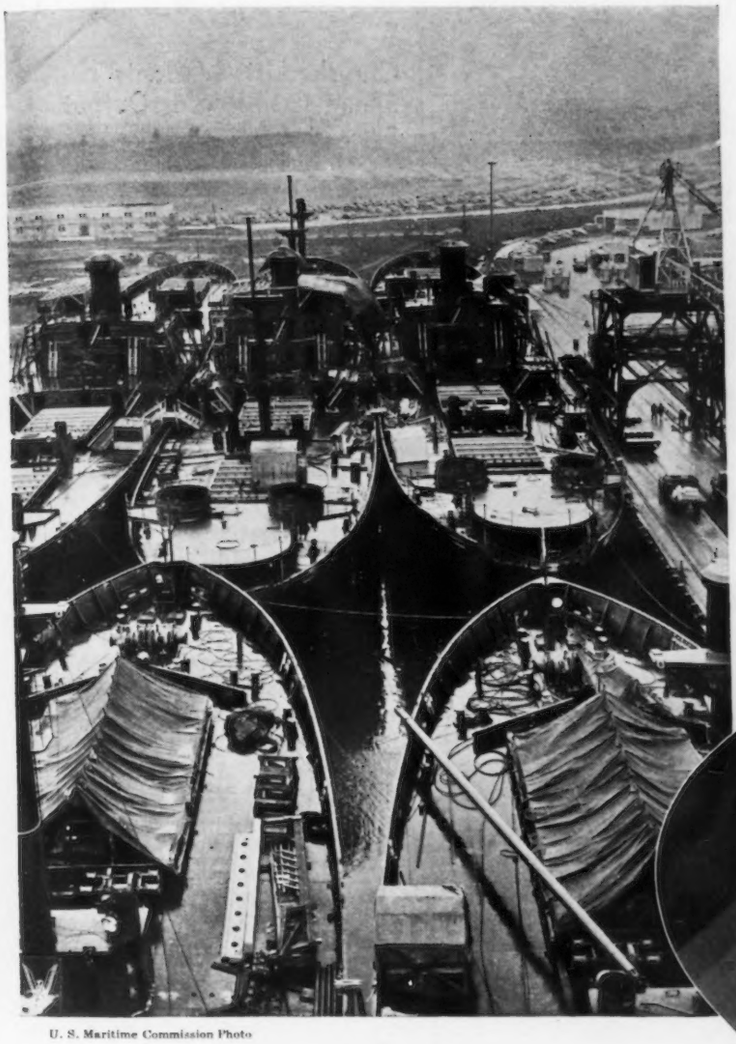
Detroit

• • • **The speed with which** Continental Motors Corp. got into production on war work was the subject of praise when the company was awarded an Army-Navy E-Flag for its accomplishments. Col. A. B. Quinton, Jr., chief of the Detroit Ordnance District, pointed out that in September, 1940, when the first contract was signed with Continental to build radial air-cooled aircraft-type engines for use in tanks, the plant was idle and emptied of machinery. It took 10 months to bring the factory to production, and in July, 1941, 10 engines were shipped.

Now, however, production is at a point where more engines are being built in one month than the plant turned out in its entire first half year of operation. The original engine quota per month is being equaled every four days and volume is still rising. Many spare parts are also being produced.

Keystone Steel & Wire Reports Slight Net Gain

• • • **The Keystone Steel & Wire Co.**, in their 53rd annual report, show a net profit for the fiscal year ending June 30 of $1,796,000 after deducting all charges and federal taxes, the equivalent of $2.37 a share on 757,632 shares of capital stock. This compares with the net of $1,618,376 for the preceding fiscal year, equivalent on the same basis to $2.13 a share.

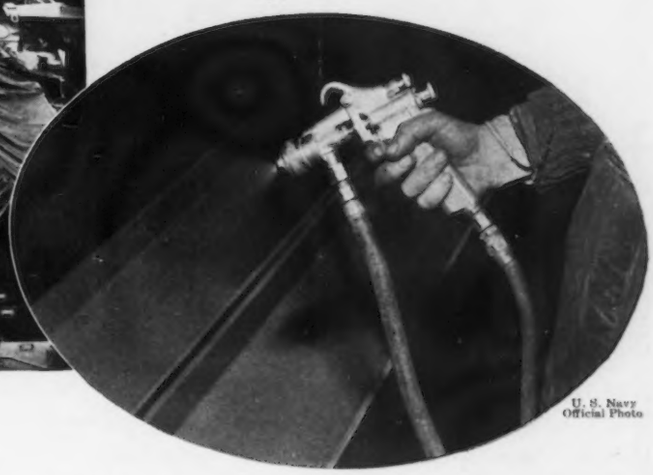


U. S. Maritime Commission Photo

Harnessing

SEA HORSES

that are raised and ready for war duty in 46 days!



U. S. Navy Official Photo

● In hundreds of shipyards, America is raising a new kind of sea horse, that can be harnessed to carry 9000-ton loads of vital materiel to our far-flung fighting bases. And the speed with which we're raising these sea horses will amaze you.

In the time it takes a freighter to sail from New York to Cairo and back, the U. S. Maritime Commission can put more than 300 of these new merchant vessels into service. The big reason for this speed is the Liberty Ship—a husky 10,000-ton, 441-foot cargo carrier that is being built by the mass production methods that have made American industry the envy of the world.

Modern spray-painting equipment is a big help in achieving this record building pace. Shipyards are saving days on deliveries with the high-speed painting that is possible with DeVilbiss Spray Equipment. And in hundreds of other plants, busy producing essential implements of war ranging from shell to tanks, DeVilbiss Spray Systems are speeding the delivery of the arms that will sink the Axis quicker.

Maybe you've been wondering how you can get more speed to swell the flow of war materiel to our fighting fronts. Then check your finishing department. If its production rate is determining your delivery schedules, ask DeVilbiss for their suggestions for speed-up.

THE DEVILBISS COMPANY • TOLEDO, OHIO

Canadian Plant: WINDSOR, ONTARIO

• • •

THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials Spray booths and exhaust fans for vapor and dust elimination Air regulators, cleaners and dusters • Air compressors • Respirators Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint stripers • Medicinal atomizers.

DEVILBISS SPRAY SYSTEMS

FATHER TIME GETS JOLT

During the last twelve months, Father Time has been given one of the biggest jolts he has ever had to take.

American Industry is beating time. It is demonstrating that it can turn out *more* production, and *better* production, *faster*, than any other country in the world. Planes, tanks and guns are now rolling. Ships, large and small, are now sliding off the ways. Make no mistake about that.

But the demands placed upon the productive system of this country are incredible. America has been asked to furnish the four corners of the world with the equipment it takes to win this war. And that equipment is desperately needed now. Not next week. Not next year . . . but right now!

Let's line up everything we have, 100 per cent, for seven days a week, 24 hours a day, maximum production!

Geo. A. Trundle Jr.

P. S. Main job of our organization today is *conversion*.

THE TRUNDLE ENGINEERING COMPANY

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Chrysler Lists 24 Plants Scheduled for War Output

Detroit

• • • **Production accomplishments** of Chrysler Corp. have been summarized in a new booklet sent to dealers this week by K. T. Keller, president. The pamphlet lists 24 plants which are, or will be, in production on war work, with total area of 28 million square feet "in uniform," or scheduled to be.

It was stated that large amounts of shell forgings of sizable caliber are being produced monthly, along with cores for armor piercing cartridges at the rate of over one million a month. It was said that 40 mm. anti-aircraft cannon production is now at a new high rate of volume.

Medium tank production is said to be underway now powered by special gasoline motors produced from existing commercial facilities. It was promised that the rate would exceed "by many times" the present volume production as soon as change-over has been finished.

Mention was also made of other military production, such as trucks of various types from one-half to one-and-one-half-ton rating, aircraft sections, marine tractors, landing apparatus for airplanes, trailer fire pumps, air raid sirens and sintered iron mechanical parts.

It was said that one plant, now building, will be one of the largest in the world and will have more employees than were ever on payroll in the Dodge main plant at Detroit.

Hotel Allocations for Metal Show Guests Made

Cleveland

• • • **The Housing Bureau** for the National Metal Congress, meeting last week, allocated several thousand hotel rooms here for the week of Oct. 12, to care for advance room reservations. Visitors have been asked to address their room reservations to the Housing Bureau, National Metal Congress, in care of the Cleveland Convention and Visitors Bureau, Terminal Tower, Cleveland. In making reservations, the type of room and hotel preferred should be specified. W. H. Eisenman, managing director of the National Metal Exposition, which will be held in Cleveland Public Auditorium, announced that 249 manufacturers have now reserved 94 per cent of the display space.

Sharp Rise Shown by Machine Tool Figures

• • • The value of 28,300 new machine tool units shipped during July was $113,600,000, it was announced Aug. 28 by the War Production Board. During June 26,600 units valued at $111,100,000 were shipped.

Production of machine tools has reached a rate of more than $1,360,000,000 a year. Last year the value of machine tools was about $771,400,000 and the present going rate represents an increase of more than 76 per cent.

Compared with the same month of last year, the July value of machine tools is an increase of 96 per cent.

Early Charcoal Stack's Name Given to New Armco Furnace

Ashland, Ky.

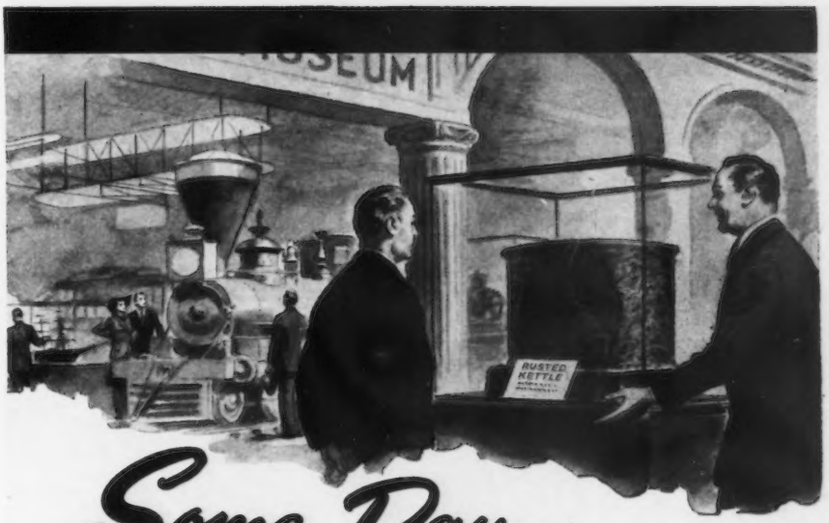
• • • **Reviving a name** prominent in the annals of the Tri-State area, Lt. General William S. Knudsen and George M. Verity, chairman and founder of American Rolling Mill Co., christened Armco's new Ashland blast furnace "Bellefonte" and dedicated it on Aug. 24. The new pig producer is rated above 1000 tons per day.

The original Bellefonte was lighted in 1826 and cast its last pig in 1891. It was a small charcoal furnace. The new Bellefonte is as tall as a 19-story building. Eleven thousand gallons of water are pumped to it every minute. The ore yard, complete with a car dumper and traveling crane, can hold 450,000 tons. Arthur G. McKee & Co., Cleveland, constructed the furnace.

Electric Energy Output At New All-Time High

Washington

• • • **Electric energy** produced for public use in July reached a new all-time monthly high of 15,762,924,000 kw-hr. This was announced last week by the Federal Power Commission, which indicated that this figure was 11.9 per cent above July, 1941, output. Average daily production also reached a new high, almost 2 per cent over last month's figure. Production by water power in July amounted to 5,107,551,000 kw-hr., or 32.4 per cent of the total output for public use.



Some Day-
..RUST" will be a Curiosity!
in the Process Industries

In many modern plants, it is already "extinct." In others, only wartime restrictions of stainless steels have delayed this transformation program.

One outstanding achievement in steel, which for 10 years has found increasing acceptance in the Process Industries, is IngAclad Stainless-Clad Steel. Here is a material whose contact side gives the same protection afforded by solid stainless metal. Yet, because an 80% backing of mild steel is used in its production, the material cost for this genuine stainless service is brought within reach of all.

May we suggest that you prepare now for improved peacetime production by planning the modernization of old equipment, or the fabrication of new equipment with . . .

IngAclad Stainless-Clad Steel or Ingersoll Solid Stainless Steel

• • •

The experience of our Sales Engineers is available on your present or post-war problems, without cost or obligation.

Today for VICTORY!
Tomorrow for ECONOMY!

Today our entire production of both IngAclad Stainless-Clad Sheets and Plates, and Ingersoll Solid Stainless Sheets is devoted to essential war needs. If your operations enable you to obtain the necessary priority rating, write us.

"A Borg-Warner Product"

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INGACLAD
STAINLESS-CLAD STEEL

5 ★★★ R&M HOISTS Speed this Firm's War Work!

This view of a winch-type R & M Hoist shows the extremely compact design that provides utmost plant headroom. Hoisting mechanism is so accessible that it may be quickly withdrawn when cover is removed.

You're looking at the scrap department of the United Screw and Bolt Corporation, where a 6000-lb. winch-type R & M Hoist helps salvage vital scrap metal. It not only *speeds* the return of scrap to the mills for reprocessing, but makes this essential job *easier* for the men in the plant.

Four other R & M Hoists are performing equally important lifting and conveying roles in other parts of the plant. Vice President C. E. Kramer says, "We have found that R & M Hoists are the most dependable, and are engineered for long life with minimum maintenance."

And here are still *more* reasons why production men specify R & M Hoists! They're *all steel* from track to hook; they handle loads from *any* angle, with perfect balance; they're *precision-built* for peak performance; their range of capacities, from 1000 to 15,000 lbs., assures the right hoist for every job.

Whatever *your* hoisting problem, "take it up" with R & M! Our expert representatives will help you find the solution. Call the nearest R & M sales and service office, or write us at the factory.

R & M HOIST & CRANE SALES AND SERVICE OFFICES

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
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Boston.....55 Long Wharf
Buffalo.....2005 Delaware Ave.
Chicago....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland..352 Rockefeller Bldg.
Dallas.....1100 Cadiz St.
Denver.....1420 16th St.
Detroit.....2921 E. Grand Blvd.
Houston..3715 Harrisburg Blvd.
Jacksonville....305 Bisbee Bldg.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia.....401 N. Broad St.
Pittsburgh.....H. W. Oliver Bldg.
San Francisco, 116 New Mtgmry. St.
Seattle.....216 Walker Bldg.
Syracuse....204 State Tower Bldg.
Montreal....Lyman Tube & Supply Co., Ltd.

ROBBINS & MYERS • Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

Week's Construction Shows Slight Decrease

• • • **The week's construction** volume shows a decrease of 6 per cent under last week with a total of $217,798,000 which is an increase of 75 per cent over the corresponding period last year, according to *Engineering News-Record*. Public construction nearly doubled itself over this period a year ago, gaining 98 per cent, but is 6 per cent below a week ago. Federal work is up 152 per cent over last year but is down 7 per cent under last week. Private construction is down 59 per cent from last year's mark but climbed 15 per cent for the week.

Foundry Equipment Order Index Higher

• • • **An index of foundry** equipment orders compiled through July by the Foundry Equipment Manufacturers Association indicates a substantially higher level throughout the first seven months of 1942 compared with the closing months of 1941. July statistics show new equipment orders at 909.1, repairs 474.0, and total business at 800.8, up eight times from the monthly average during the 1937-39 period. Biggest months of the year were March with total volume at 1122.3 and April with 1089.3.

New Handbook of Ship Construction and Operation

• • • **A wide range** of information valuable to men who build and operate ships has been gathered together in the third edition of the 558-page "Handbook of Ship Calculations, Construction and Operation." Its contents range from data on strength of materials through ship and hull calculations to loading and operation of vessels. Each section is followed by a bibliography. The book is quite inclusive in scope so as to provide an outline of fundamentals to new men in the profession. Typical of this are the sections describing various craft and those detailing the specifications and compositions of materials used in shipbuilding. On the other hand, the chapters on ship calculations and hull construction contain helpful tables and design data for the more experienced man. Charles H. Hughes, compiler. McGraw-Hill, $5.00.

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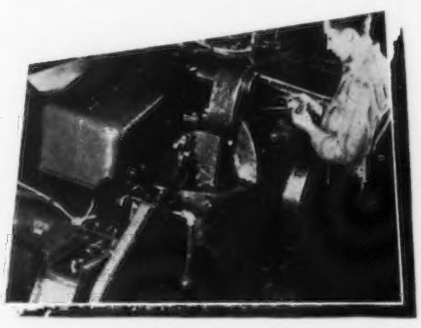
HIGH PRIORITY
STEEL !

NATURALLY you want to make most effective use of every pound of steel you can get. When your orders for bolts and rivets specify Oliver, you are conserving vital steel, because Oliver *forges* these fasteners by the upsetting, rather than the cutting method. This reduces scrap to an absolute minimum, and speeds production.

You can be supplied with the types and sizes of bolts, nuts, rivets, or other steel fasteners you need by Oliver—and be assured of using effectively every pound of steel your order requires. This is an efficient, patriotic way of best observing the restrictions on vital steel.



OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

Wickwire Spencer Stacks Set New Company Record

• • • **Production of** the blast furnaces of the Wickwire Spencer Steel Co. during the first seven months of the year increased 78 per cent, as compared with the corresponding period of 1941, and has set a new record in the company's history, E. C. Bowers, president, announced. Larger production was announced also for the company's open-hearth furnaces, as well as for both the blooming and rod mills.

"While it is not permissible to give out exact figures," Mr. Bowers said, "we can announce that production of wire rope, one of our principal products, increased 24 per cent during the first six months of the year. Output of coarse mesh wire cloth expanded 73 per cent, while production of spiral wire fabric, used in making conveyor belts, showed an increase of 43 per cent."

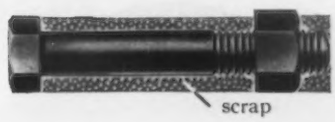
COMING EVENTS

Sept. 1 to 11—Building and Construction Trades Council, Atlantic City.
Sept. 2 to 5—Roadmasters and Maintenance of Way Association of America, Chicago.
Sept. 17—American Hot Dip Galvanizers Association, Inc., Cleveland.
Sept. 22 to 24—Association of Iron and Steel Engineers, Buffalo.
Sept. 29 to Oct. 2—American Institute of Steel Construction, Colorado Springs.
Oct. 7 to 10—The Electrochemical Society, Inc., Detroit.
Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
Oct. 12 to 16—American Welding Society, Cleveland.
Oct. 12 to 16—American Institute of Mining and Metallurgical Engineers, Cleveland.
Oct. 15 to 17—American Gear Mfrs. Association, Skytop, Pa.
Oct. 15 to 17—Federation of Sewage Works Association, New York.
Oct. 16 and 17—War Production Conference of American Society of Tool Engineers, Springfield, Mass.
Oct. 18 to 21—American Public Works Congress, Chicago.
Oct. 19 to 23—Wire Association Meeting, Detroit.
Oct. 27 to 29—National Safety Congress Association, international convention, Chicago.
Nov. 17 to 22—National Chemical Exposition, Chicago.
Nov. 30 to Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Astor, New York.
Nov. 30 to Dec. 5—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

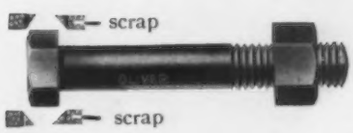
HERE'S HOW
TO SAVE STEEL
AND GAIN *Speed*

OVER 99% of Oliver's production of bolts, rivets, and steel fasteners is made by the steel-saving *upsetting* method. Thus you get full value from every pound of steel your priority furnishes. The Oliver method is faster . . . permits the use of tougher high-strength steels . . . and you get speed which is vitally important today.

THIS IS WASTEFUL
(Cutting-away Method)



THIS IS FAST AND SAVING
(Oliver Method)



Take advantage of the speed and savings available with Oliver production methods! Your essential steel fastener requirements will receive prompt handling at Oliver—always!

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PITTSBURGH, PENNSYLVANIA
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STEEL FASTENERS

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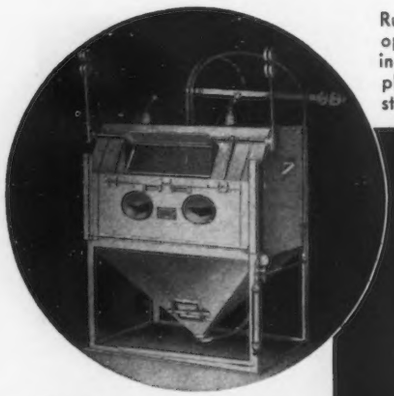
LEE-BUILT TRADE MARK SPRINGS

SAND BLASTING *Made Easy*
for War Production!

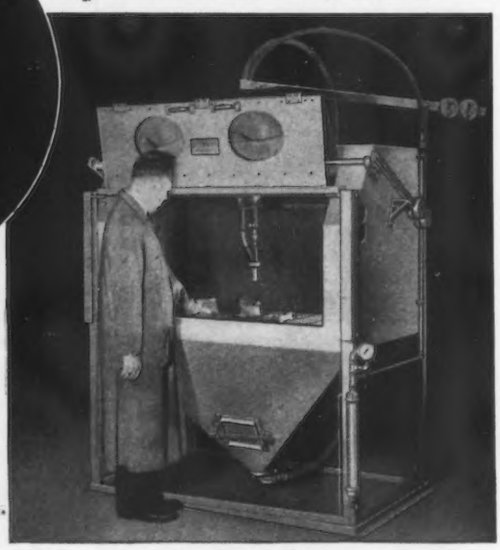
Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Eliminate dust, permitting installation anywhere in the plant. No skilled labor required. Sturdily constructed. Handles sand or steel abrasives.



RECOMMENDED FOR:

1. Heat treating plant — removing scale, oxides.
2. Aircraft production—cleaning welds, metal preparation.
3. Foundries, ferrous and nonferrous — cleaning castings.

RUEMELIN MANUFACTURING CO.
3960 N. Palmer St • Milwaukee, Wis.



Ruemelin cabinet with door open. Provides quick access for loading and unloading.

RUEMELIN Blast Cleaning Cabinets

52 More Plants Awarded Army-Navy Production Honors

• • • **Forty-nine** additional industrial plants have been selected to receive the joint Army-Navy Production Award in recognition of outstanding performance on war work, Under Secretary of War Robert P. Patterson and Under Secretary of the Navy James V. Forrestal announced Aug. 24. The group includes:

American Tool Works Co., Cincinnati.

Belmont Radio Corp., Chicago.

Charles C. Allen Co., Barre, Mass.

Cincinnati Bickford Tool Co., Cincinnati.

Commercial Shearing & Stamping Co., Youngstown.

Delco Products Division, General Motors Corp., Dayton, Ohio.

Diebold Safe & Lock Co., Canton, Ohio.

Ex-Cell-O Corp., Detroit.

Fosdick Machine Tool Co., Cincinnati.

Galvin Mfg. Co., Chicago.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Guide Lamp Division, General Motors Corp., Anderson, Ind.

Hallicrafters Co., Chicago.

Independent Lock Co., Fitchburg, Mass.

Kearney & Trecker Corp., Milwaukee.

Kendall Co., Bauer & Black Division, Chicago.

Landis Machine Co. (M52 Fuse Plant) St. Louis.

Lapointe Machine Co., Hudson, Mass.

R. K. LeBlond Machine Co., Cincinnati.

Lincoln Engineering Co., St. Louis.

Lundguist Tool & Mfg. Co., Worcester, Mass.

Marchant Calculating Machine Co., Oakland, Calif.

Micromatic Hone Corp., Detroit.

Miller Printing Machinery Co., Pittsburgh.

National Pneumatic Co., Rahway, N. J.

National Tube Co., National works, Christy Park works, McKeesport, Pa., Ellwood works, Ellwood City, Pa.

National Twist Drill & Tool Co., Detroit.

Omaha Steel Works, Omaha.

Otis Elevator Co., Yonkers, N. Y.

Putnam Tool Co., Detroit.

Wide-World

ICED FOR TIGHTNESS: Workers in the Douglas Aircraft plant, Los Angeles, are becoming accustomed to going to the refrigerator for their rivets too. Used only on transport planes, these rivets are chilled to contract them to their smallest size.

RCA Manufacturing Co., Harrison, N. J.

Remington Arms Co., Inc., (Main Plant), Bridgeport, Conn.

Robertshaw Thermostat Co., Youngwood, Pa.

Rogers Bros. Corp., Albion., Pa.

Sheffield Corp., Dayton, Ohio.

Star Electric Motor Co., Bloomfield, N. J.

Stewart-Warner Corp. (South Plant), Chicago.

Stockham Pipe Fittings Co., Birmingham.

Strontium Products Co., Chauncey, Ohio.

Struthers Wells-Titusville Corp., Titusville, Pa.

Tube Turns, Inc., Louisville.

United Engineering & Foundry Co. (105mm. Howitzer Plant).

United Shoe Machinery Corp., Beverly, Mass.

Universal Boring Machine Co., Hudson, Mass.

Vilter Mfg. Co., Milwaukee.

Western Cartridge Co., East Alton, Ill.

William Sellers & Co., Inc., Philadelphia.

Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

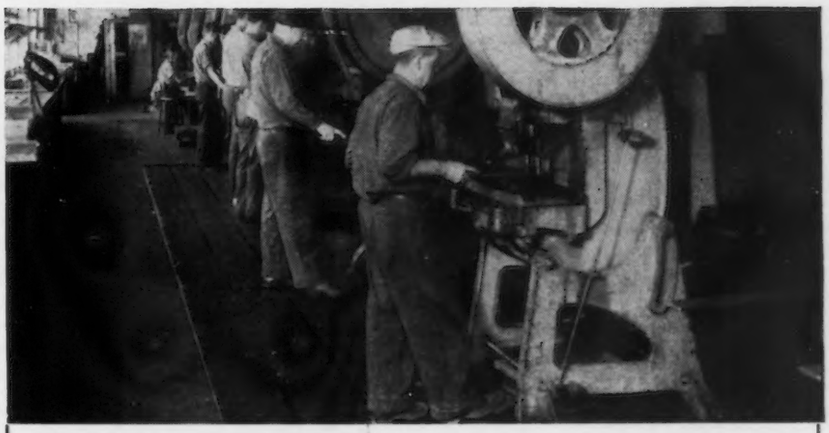
Wright Machine Co., Worcester.

Zenith Optical Co., Huntington, W. Va.

Maritime Awards

Kerotest Mfg. Co., Pittsburgh, Pa.

Koppers Co., Bartlett-Hayward Div. foundry, Baltimore.



PINCH HITTING FOR RUBBER!

Carey CORRUGATED FLOOR RUNNER

LESSENS ACCIDENTS . . . PROTECTS FLOORS . . . COMFORTABLE UNDER FOOT . . . LOW COST . . .

This product of Carey research is of asphaltic composition; similar in appearance to rubber floor runner, serves same useful purposes. Used extensively in factories, offices, halls—even before rubber became unavailable. Non-skid, resilient surface promotes safety and efficiency of workers. Durable; very economical. Available in rolls 36" wide, 30' long; also in Floor Mats, Stair Treads. Write for samples, prices. Address Dept. 26.

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ASBESTOS SWEEPING COMPOUND

This safe sweeping compound quickly removes oil and grease deposits. No acids or caustics; will not erode. Recommended for garages, filling stations, factories, wherever oil and grease spillage occur. Very economical; can be re-used. Available in 50-lb. bags. Write for sample and prices. Address Dept. 26.

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Canada Soon to Boost Its Production of Guns

Ottawa, Canada

• • • **Large plant additions** are nearing completion in Canada which will assist production of guns and other equipment. C. D. Howe, minister of munitions and supply, stated that facilities are being provided to double production of Bren guns. The expanded program, which will result in increased output of several thousand units per month, is expected to be attained between December and March. Mr. Howe also stated that the output of Sten machine carbines will be quadrupled, with planned capacity ultimately equal to that of the Bren gun. In addition, the new Browning tank type machine gun, now is in production in Canada, together with a 100-round Bren gun magazine, a 90-mm. anti-aircraft gun barrel, and a 4.5 in. anti-aircraft gun carriage. By September, Lee-Enfield rifles will be rolling out at a rate of many thousands per day.

Amplifying his statement, the minister stated: "Three years ago the manufacture of guns was virtually unknown in Canada. Only the Ross rifle was turned out during the last war, but today Canadian guns are in service on most battle fronts.

In addition to previously announced gun production in Canada, work is in progress, and in most instances far advanced, leading to the production of Vickers naval guns; a second type of 4-in. naval guns; three types of naval mountings; two types of gun carriages, and secret equipment.

"When Canada undertook the manufacture of guns," Mr. Howe stated, "our industries had no knowledge of the complicated designs, of the many parts, of the extremely fine tolerance, of the metallurgical difficulties, or of the huge and expensive machine tools which are essential to their production. At the beginning of the war Canada obtained an order for a very small number of loose barrels for anti-aircraft guns. So fine was the quality of the output of those barrels that an initial order was received from Great Britain for the manufacture of a light anti-tank gun and mobile carriage. Then, with the fall of France, Canada was called upon suddenly to turn out equipment in quantity.

"To implement a program of this magnitude, we required plant capacity, labor, management, raw materials, and machine tools on short notice. All suitable buildings and equipment were immediately put to use and capital assistance amounting to many tens of millions of dollars was made available for the construction of new plants and their equipment.

Following these initial steps, Mr. Howe stated, it became necessary to obtain quickly, and in sufficient quantities, the raw materials required—alloy steels, iron, copper, brass, and rubber. Indicative of the problem which confronted Canadian industry is the fact that 262,000 pounds of steel are required in the manufacture of 1000 Bren guns; 80,000 pounds for 1000 Browning anti-aircraft guns; 148,000 pounds for 1000 Boys anti-tank rifles.

AMPCO CASE HISTORIES

The designing engineers of aircraft companies believe "an ounce of prevention is worth a pound of cure." When they need material that will withstand tremendous stresses, many specify and use a strong rugged bronze that they *know* is the best available for the service — Ampco Metal, which has proved its worth in hundreds of severe industrial applications.

In aircraft application, the use of Ampco Metal safeguards the operation of important equipment in combat planes. Thousands of dollars worth of bombers and fighters and the lives of skilled pilots are safeguarded through use of Ampco parts. Wherever bronzes are needed, play safe with Ampco!

Literature on request.

AMPCO METAL, INC.

DEPARTMENT IA-9 MILWAUKEE, WISCONSIN

AMPCO METAL

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THE METAL WITHOUT AN EQUAL

Laundry Machinery Hit By New Canadian Ruling

Toronto

• • • **The Canadian Government** is continually tightening restrictions on civilian and non-essential consumption of iron steel and other metals, with the single purpose of making supplies of these materials available to war industries. A new order issued by Alan H. Williamson, controller of supplies, prohibits after Sept. 1, except by permit, the manufacture or sale of commercial washing machines or any other machinery used in commercial laundering or dry cleaning. The order, however, permits manufacture and sale of repair parts. The order does not affect sales of second-hand machinery.

New Priorities Offices Open in 2 Canadian Cities

Toronto

• • • **The department of munitions** and supply announced the opening of branches of the priorities officer in Montreal and Hamilton, in addition to offices previously opened in Toronto, Halifax and Vancouver. These branch offices of the priorities officer are to assist in speeding the flow of war materials. The department also announced the appointment of two priorities representatives: W. D. Lachapelle, Ciba Building, Montreal, and A. W. Rymal, Terminal Building, Hamilton. The two men recently completed training for their new posts at Ottawa and Washington, and have had lengthy business experience in the cities in which they are located.

Carmichael New Coordinator of Canadian War Production

Toronto

• • • **Important organization** changes within the Department of Munitions and Supply, have been announced by C. D. Howe, minister. H. J. Carmichael, formerly director general, gun production branch, becomes co-ordinator of production and, as such assumes the chairmanship of the production board, previously known as the departmental production committee. The industry and subcontract co-ordination branch also will operate under Mr. Carmichael.

The gun production branch has been taken over by E. J. Brunning, who becomes director general, ammunition and gun production branch.

F. H. Brown, relinquishes the position of assistant deputy minister, to become financial advisor of the department.

J. P. Pettigrew continues as assistant deputy minister with wide duties in respect to administration within the department.

R. C. Berkinshaw, formerly assistant deputy minister in charge of industrial controls and chairman of the Wartime Industries Control Board, relinquishes the title of deputy minister, but continues as chairman of the control board.

A. H. Williamson, controller of supplies, has been named vice-chairman of the Wartime Industries Control Board.

THESE "Suicide Springs" for ammunitions are called on to do their *vital* job but once—and *that job blows them to "smithereens!"*

For their lifetime of one single spring action, they're built to the same fine tolerances—with the same care, precision and accuracy that goes into all Accurate Springs.

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Army Air Force Requirements

• • • **Below** is a list of some current requirements of the Army Air Force. If you can fill any of these requirements, write to the following address: Army Air Corps, Materiel Division, Office of the Eastern District Supervisor, Room 1102 C.H., 90 Church Street, New York. **Do not** write to the Air Corps, unless you have the item listed. **Do not** write to your WPB office regarding these items.

Brass:

Naval Brass, 2¾-in. dia. x 2 in. long; Naval Brass, 6¼-in. dia. x 4½ in. long R-1782
2300 lb. of 0.125 in. thick x 4½ in. wide or 6 1/16 in. wide half hard clock brass or high brass in random six-foot flat lengths R-1800

Steel:

Cold rolled steel—2400 ft. 5/16 x 3 in.; 512 ft. 1 x 3 in.; 512 ft. 1 x 6 in. .. R-1726
10-in. I-Beam—35 or 40 lb., 600 lineal ft. R-1328
30 ft. of 7-in. ship channel, 20.3 lb. per ft. Minimum length, 6 in. R-2460
Cold rolled steel, U. S. N. 468 17 Class B—200 lb. ⅞ in. rd.; 2500 lb. 1⅛ in. rd.; 3200 lb. 1 7/16 in. rd. R-1341
Steel plates—26 in. x 52 in.—2-in. thick—Firebox quality, ASTM—Specification A-70; ASME—Specification S-1.. R-1419
Steel tubing, X4130—1 5/16 x 7/32 in. wall—120 ft. required—60 ft. required immediately R-1421
Steel bars—½ x ½-in. sq., cold drawn in SAE 1040, 1045, 1060 ..... R-1301

	Diameter, in.	Length, in.	
SAE steel—1045	3½	1¼	
1095	3½	⅝	
1095	3½	1	
1095	2¾	2¼	
1095	2¾	1½	
1035	2¾	2¾	
4340	4½	6	
4340	3½	4¾	
4340	6¼	4½	
4140	2⅜	213	R-1781

1¼ in. round cold drawn SAE 4140 rod; 1¼ in. round SAE 1315 XI rod R-2365
150 ft. ½ x 4 in. c.r.s.; 250 ft. ½ x 5 in. c.r.s.; 115 ft. ½ x 4¾ in. c.r.s.; 100 ft. ½ x 4½ in. c.r.s. R-2442
Seamless steel tubing: 480 ft. 6½ in. O.D. x 6⅛ in. I.D.; 400 ft. 4⅛ in. O.D. x 3⅜ in. I.D.; can use 4⅛ in. x 3.313 I.D. or 4⅛ in. O.D. x 3.249 in. I.D.; 160 ft. 8⅛ in. x 7½ in. or 8¼ in. x 7½ in. R-1802

Wire:

335 ft. of 3 Conductor No. 4-0 Wire—300 Volt or over or 1000 ft. of No. 4-0 Wire R-1410

Muntz Metal:

No. 11 B. & S. Muntz metal—30 pieces 20 x 20 in., 29 pieces 30 x 57 in., 30 pieces 5½ x 14 in.; No. 14 B. & S. Muntz metal—32 pieces 16 x 26 in., 12 pieces 1½ x 11 in. R-2458

Sub-Contracting Facilities Wanted:

Fabricating Thermix induced draft fans and diffusers thermix tubular dust precipitators & Thermix Multicyclone dust precipitators R-2386
2 Dumore external grinders R-2452
No. 8 hand millers R-280
Niagara power shear & Cincinnati shear R-1195
J. & L. turret lathes for bar work up to 3 in. in diameter R-2364

Bends:

150 ft. of straight track and two right angle and two 45 deg. bends R-1520

Boring Mills:

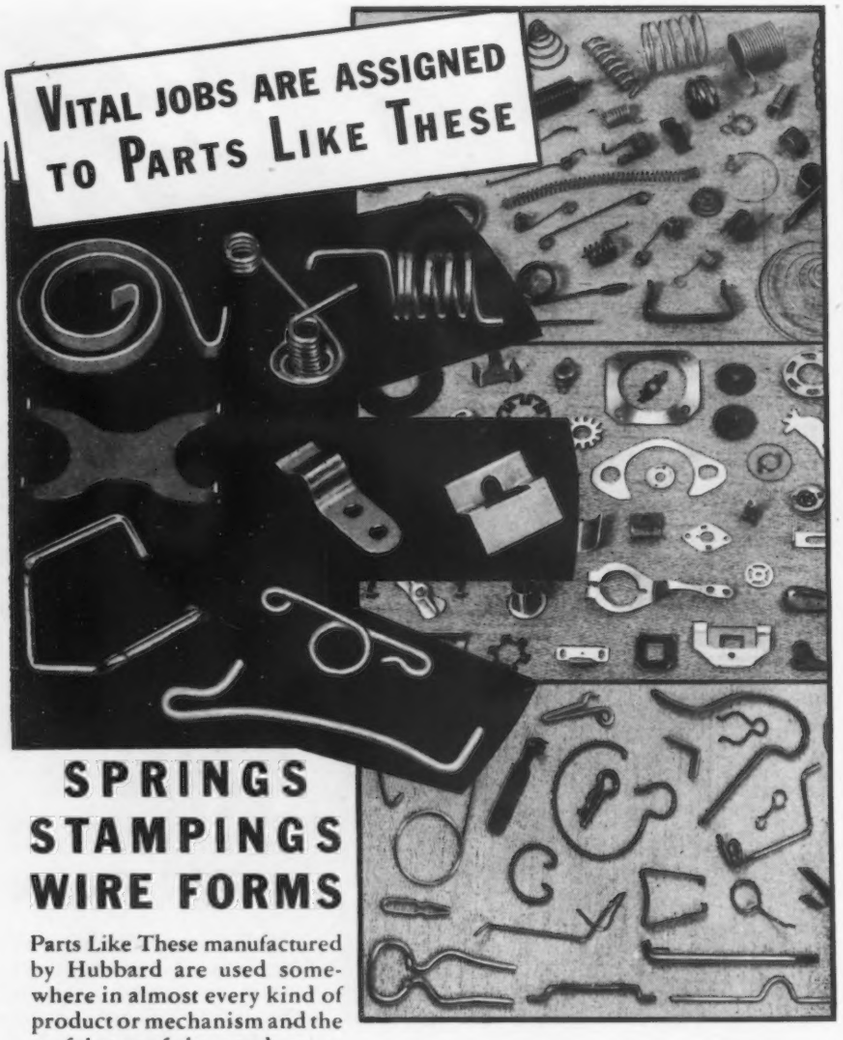
1 Colburn 42-in. boring and turning mill, motor drive without motor, gear box for feed change with two swivel heads on cross rail, all power feeds with one extra drilling head in perfect condition R-1330
2—72-in. or 84-in. vertical boring mills—2 heads on rail, no side head—must be in good condition R-1408
Bullard Multimatic vertical boring machine, model J-7 ..... R-1454
36-in. Bullard vertical boring mill R-1267

Cut-Off Machines:

Abrasive cut-off machine for steel bars or tubes up to 6-in. diameter R-1407

Drilling Machines:

5-ft. Western drill with tapping attachment R-699
2—Sensitive drills—(H. M. Hamilton supersensitive drilling machine) R-1375
No. 989 Delta drills—large size —½ in. Shank R-1381
1 Multiple spindle drill similar to a Natco No. B-4-B; 8 to 12 spindles, 1½-in. holes R-2307
20-in. W. F. and John Barnes Co. sliding head vertical drill press R-2007
Avey 6-spindle drill press R-2422
4-spindle Henry & Wright class B high speed ball bearing drill press, belt drive R-1400
Drill presses—Ht., 25 in.; Column Dia., 3 in.; table travel, 10 in.; spindle travel, 4¾ in.; chuck to base, 16 in.; drill capacity, ½ in. R-1607
Multiple head drill, Natco or equivalent, 16 spindles, ¼ in. diameter holes ... R-2306
2—3-ft. Radial drills with reverse attachment R-2345



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Parts Like These manufactured by Hubbard are used somewhere in almost every kind of product or mechanism and the usefulness of the product, or the proper functioning of the mechanism, often of vital importance, are dependent upon them.

They are manufactured by Hubbard from steel, brass, bronze and other material . . . formed, shaped, heat treated, tested and assembled with modern equipment and scientific instruments.

Your request for information on Parts Like These and their use and application in your products will be carefully analyzed; suggestions and recommendations will be returned to you.

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331 CENTRAL AVE. • PONTIAC, MICH.

Gear Hobber:

No. 2 Barber Colman gear hobber R-2421

Shapers:

Hendey 15-in. friction R-1447
Gould & Eberhardt 32-in. R-1342
Gould & Eberhardt 20-in. R-1326
18-in. Precision R-1239
Gould & Eberhardt 16-in. R-1059a
Rockford 16-in. R-1094

Screw Machines:

4 Cleveland automatics, 2¼ to 3¼-in. diameter R-1747
12 No. 00 Brown & Sharpe R-1559
One 1¼-in. capacity machine R-1325
2 or more B & S No. 00, new or second hand R-1332
One machine, capacity to ¼-in. diameter R-2367
3 or 4 screw cutting machines, capacity 1½ in. R-2335

Grinders:

No. 2 centerless grinder R-1748
10 x 24-in. hydraulic surface grinding machine R-962
Pratt & Whitney curvex cutter grinder. R-2478
Norton external cylindrical grinder, 10 x 18 in. R-1488
12 x 36 in. Pratt & Whitney vertical surface grinder R-1511
No. 2 Norton tool and cutter grinder ..R-1573
No. 2 Cincinnati universal tool and cutter grinder R-2428
No. 13 B. & S. universal and tool grinder R-2479
No. 2 B. & S. surface grinder R-2085
No. 18 Bullard grinder R-1801
6 x 36-in. J. & L. automatic thread grinding machine R-1042
Cylindrical grinder for small work ...R-1830

Cutters:

Side milling cutting machine—8-in. diameter x 34-in. face R-950

Lathes:

Logan bench lathe—18-in. swing R-1542
24 x 46-in. heavy duty LeBlond lathe ..R-1597
14-in. x 6-ft. Lodge & Shipley lathe ...R-1210
Hendey 14-in. x 8-ft. lathe R-1249
South Bend Series "S" quick change underneath motor drive lathe complete with all standard equipment R-1248
South Bend Model "A" 12-speed back geared quick change gear horizontal motor driven precision bench lathe ..R-1247
10-ft. x 16-in. South Bend lathe R-1327
American 20-in. x 8-ft. lathe R-2058
15-in. x 8-ft. South Bend quick change lathe R-2245
10-in. Atlas lathe complete with all tools and attachments R-1319
12-in. Hendey lathe with accessories ..R-2425
14-in. x 8-ft. Hendey lathe with taper attachment, draw bar and collet R-2419
Turret lathe, 1¼ to 2-in., modern machine R-2181
Rebuilt or new engine lathe 16, 18 or 20-in. swing, 6-ft. bed, 30-in. between centers, equipped with quick gear change, compound with 8 to 9 in. travel preferred, power feed R-2436
J. & L. turret lathe with 2¼-in. hole through spindle R-2072
Pratt & Whitney bench lathe (high speed precision with 3-jaw chuck, draw bar and 12 collets) R-1795
No. 2 Cincinnati Acme universal fixed center hollow hexagon turret lathe ..R-1805
No. 2 Cincinnati Acme universal cross sliding hollow hexagon turret lathe ..R-1806
Lathes—plain—small size R-1338
Turret lathes—small size R-1340
18-in. swing Logan bench lathe R-1818

Portable Boring Bars:

Portable Boring Bars—3½ in. x 6 ft. 8 in.; 6 in. x 8 ft. 2 in.; 6 in. x 12 ft. 2 in. R-1453

Milling Machines:

No. 2 Cincinnati horizontal universal milling machine, 4 step cone back geared R-2033
Floor type milling machine with 24 x 6½-in. table, hand or power feed complete with ⅝, ¾ or 1-in. arbors..R-1320
Brown & Sharpe No. 2 vertical milling machine R-2429
Spar miller, 20 ft. R-2175

Miscellaneous:

Chicago model 6L8 steel press brake...R-1357
1 pair of 7 x 12-in. bench surface plates R-2227
Dividing head, 10½ in. R-1615
10-in. Universal index centers R-1354
Clarage fan, type HSV size 1½ in.; Direct drive motor base, no motor, two roller bearings R-2024
Racks for transporting cases about 10 or 12 ft. long with rollers every six or eight in. R-1519
Hydraulic presses—10 platen presses of 20-ton capacity R-1804
Shuster riveting machine, ⅛-in. capacity R-1636
Ajax continuous motion bolt and rivet heading machine R-1635
Fastener for hollow mandrel stake (large size) R-2145
Auto Call Station R-1200
Generator for magnetic chucks R-1201
Rent a 1¾-yd. shovel, gasoline or diesel powered, Caterpillar type R-1731
Chambersburg Cecostamp drop hammer, or equivalent. 24 in. F. to B.; 34 in. between uprights; 34-in. drop; 7½-in. bore R-1315
High voltage testing transformer, 60 cycle, 110/220 volts to 100,000 volts, about 5-kw. capacity R-1807

DETROIT ELECTRIC FURNACES SAVE PRECIOUS TIME IN THE MELTING OF FERROUS OR NON-FERROUS METAL

A foundry producing bronze valves and similar pressure fittings in a 1,000-pound Detroit Rocking Electric Furnace over a 5 year period averaged seventeen heats every 9 hours.

Yet this is by no means an unusual case. Performance records from all parts of the country reveal that Detroit Furnaces are doing an exceptional job of speeding up foundry production.

Whether you pour ferrous or non-ferrous metals or alloys, you can speed up your operations, save labor and floor space, reduce metal losses and maintain precise metallurgical control by using the Detroit Rocking Electric Furnace. Write today for complete facts.

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KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

Emerman Explains Lease Transaction

Chicago

• • • **Louis E. Emerman,** president, Louis E. Emerman & Co., on Tuesday made the following statement to THE IRON AGE in connection with the recent indictment of his company and others for alleged violation of priority regulations. Mr. Emerman said:

"Not having seen a copy of the charges, I do not know what to answer, but from newspaper information gathered, it is my belief that the charges arise out of a misunderstanding due to the complicated governmental regulations. Our records indicate that all proper and sufficient notice was had by all regulatory bodies.

"For the efforts that my company and its subsidiaries have put into the war effort, one of the companies recently was awarded the Army and Navy "E" for quantity and efficiency in production, having far exceeded its contract quota and this negates the charge that either myself or my company would intentionally do anything to hamper the war effort.

"This transaction arises out of a lease that our company made with the British Purchasing Commission to assist them in their war program, whereby we leased 370 valuable machines in February, 1941, at $1 per annum per each machine. These machines were used by the British government, its contractors, or the United States Navy contractors in furtherance of the war program. These machines were in use and out of our possession since the day of our lease. The 71 machines in question were in the possession of the British Purchasing Commission as subject to their sole control. The question of the British lease was settled the latter part of May, 1942, and the machines were immediately sold to a dealer, and thereafter put into use, after they were first released by the British Purchasing Commission, or the United States Navy, who had first call thereon and knowledge was had by all persons in charge of the transaction for the Navy and the other government authorities of these machines and their possession by the British Purchasing Commission and there was no concealment whatsoever."

Therm-O-flake 13½x9's

AVAILABLE IN 2" —2¼"—2½"— 3" THICKNESSES

Also in 9 x 4½" Series

INSULATION BRICK IN CONVENIENT BLOCK FORM

BRICK MASONS appreciate these easy-to-handle sizes of back-up insulation. The blocks weigh only about 3 to 4 pounds each, depending on thickness.

FURNACE OPERATORS know that one or two layers help keep heat inside the furnace. 4½" reduces heat losses better than 29" of fire brick.

ENGINEERS specify them because of proven efficiency and high thermal limit. Can be exposed safely to 2000°F. temperature on hot face.

PURCHASING AGENTS like the low cost and excellent delivery cooperation.

THERM-O-FLAKE Insulation is available in several other products, all designed for efficient insulation of High Temperature Furnaces.

Write for Information and Prices

Illinois Clay Products Company

Main Office: JOLIET, ILLINOIS

Canadian General Motors Gets Fuselage Subcontract

Toronto

• • • **General Motors of Canada, Ltd.,** will manufacture warplane fuselages under subcontract from de Havilland Aircraft of Canada Ltd., according to the Department of Munitions and Supply.

Follansbee Open Hearths Make Electric Furnace Alloys

Pittsburgh

• • • **Alloy steels,** previously made only in electric furnaces, are now being produced in open hearth furnaces at Follansbee Steel Corp., John Follansbee, chairman, announced recently. The company's open hearth capacity, normally used in making mild steel, and partially abandoned prior to the war, is now occupied 100 per cent in the production of high grade alloys.

Scrap Memo From Grace

• • • **Bethlehem Steel Co.'s** 600 steel salesmen this week had instructions from E. G. Grace, the company's president, to hunt for hidden iron and steel scrap.

As a starter, the Bethlehem salesmen scouted their own office in the company's main office building at Bethlehem, Pa., uncovering salesmen's samples ranging from rope and roofing to stainless steel bars.

Ash trays and paper weights (yours may be next) were snatched from desks of Bethlehem officials and clerical forces.

Results of this test scrap search —1584 tons of scrap for the company's furnaces.

With a list of "do's" in connection with the scrap drive, Mr. Grace issued a list of "don't's." He warned: "This is for the steel industry as a whole. We are not trying to upset any trade regulations. We are not trying to get scrap for Bethlehem as against others (steel companies). Where scrap is already being bought by Bethlehem, by competitors or by dealers, the job is being done.

"What we are trying to do is to urge everyone to collect all possible scrap, including materials not being used immediately, and getting it to the steel producers for war materials."

Bethlehem salesmen are asked to visit all customers for scrap; its warehouse managers have been urged to collect all waste material on their own premises.

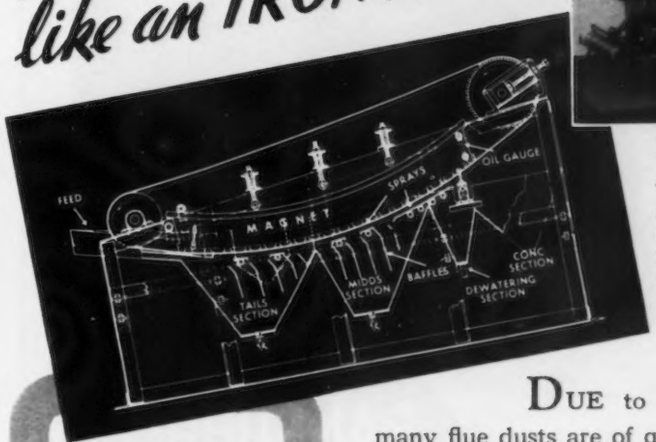
These efforts to get old metal are being directed by Coordinator John Marshall, Bethlehem Steel Co., Bethlehem, Pa.

(One of various weaknesses of the national scrap recovery movement recently has been a lack of local salvage committees which were to be set up by the thousands by the WPB's Conservation Board. In hundreds of towns these committees are yet unborn. In others they are moribund. To meet this situation, the Bethlehem salvagers have been asked to deal with such committees where they do exist, to report quickly, where they do not exist, for a checking at Washington.)

Reminding its sales-salvagers that the steel industry must find 6 million tons of scrap in the weeks just ahead, the Bethlehem president suggested that in many instances materials, such as angle irons, which may be scrap in one shop but immediately useful in another, may be turned to war production use without being reprocessed through the furnaces and rolling mills.

So far the Bethlehem company has salvaged 210,000 lb. of rubber from its steel plants and shipyards (enough for 500 jeep tires), has reduced its use of rubber in hose lines one third and is utilizing bricks impregnated with sulphur and resinous compounds instead of rubber in linings of pickling tanks.

Treat your flue dust like an IRON MINE-



• *Above—Dings Tube Separator — does Crockett job on small scale for laboratory experiment. Ask for data.*

ASK FOR DATA ON DINGS CROCKETT SEPARATORS

1. *For concentrating flue dusts. See Article Page 54, June 11, 1942, issue of THE IRON AGE.*

2. *For concentrating magnetite, ilmenite and similar minerals. Over 6,000,000 tons of iron ore now passing over these separators annually, with huge increases by next year.*

3. *For cleaning ferro-silicon medium in the sink and float process. Dings Crockett Separators used in mills producing nearly 4,000,000 tons of ore annually.*

DUE to the fact that many flue dusts are of quite low grade, recovery and return of the dusts to the smelting process result in a considerable dilution of the total charge.

It may pay you well to investigate the opportunity of overcoming serious dilution by treating flue dusts in the same manner that iron ore is successfully treated—by concentration with Dings Crockett Separators.

Test results indicate excellent possibilities for this magnetic concentration process.

Ask Dings engineers to discuss this problem with you. Write today.

DINGS MAGNETIC SEPARATOR CO.

516 E. Smith St. • Milwaukee, Wis.

Crockett Separators Are Built Only By Dings

Dings MAGNETIC SEPARATION HIGH INTENSITY

Nelson's Tighter Control Seen as Boon to Industry

Washington

• • • **Speculation** on WPB's next move in the battle of production control is rife here, with the best guessers laying odds that industry will get a well thought out and workable plan when it does come.

Donald M. Nelson has taken the first step toward this end by centralizing control in his own hands under his new "get tough" policy. "The Army, Navy and Maritime Commission are working for me. I'm in charge of the program," said Mr. Nelson. Next it was reported that Army and Navy procurement officers were to be deprived of their power to issue priority ratings. This system, which is like the housewife who feels she can write checks until she uses up her check book, was good for some immediate results, but it cannot work for long. It disrupts the PRP and won't fit into any plan of allocation and directives.

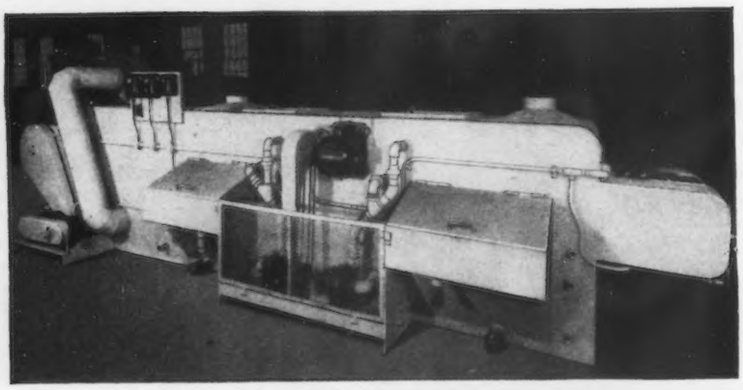
Next, Nelson told his aides to get tough in their attitude toward use of materials. They were told to drop the words "essential civilian needs" from their vocabulary, to move quickly. "It just takes too damn long to get things done in this organization," he added.

All signs point to some momentous changes in the making. In the first place, new orders and priorities regulations are falling to new lows. The Production Code, designed to clarify and simplify the Allocation Classification System, was due for promulgation about the middle of August. A three-day conference of business men in New York had it explained to them in detail and a 44-page book outlined the new regulation. A new head, A. D. MacIntyre, was appointed to administer it. But at the last minute the Production Code was called back for changes and the end of August rolled around without its enactment.

Last week Amory Houghton, director general for operations, resigned. Reese Taylor and R. C. Allen, chief and deputy chief, respectively, of the iron and steel branch, also turned in their resignations; so did Dr. H. S. Coith, deputy chief of the chemicals branch. While these resignations may have been for personal reasons, few in the WPB can be certain that their heads will not be the next to roll.

Underlying all this backstage maneuvering there lies a ray of hope for industry. Nelson is not grabbing power for the love of it but because he knows he needs centralized authority to do his job. He has apparently ordered a halt to half-baked plans. In the original priorities system, as in PRP and Allocation Classification, all industry was the guinea pig. Now it seems that new ideas—and every group has one—will be carefully checked before they are sprung. Typical of this is the Navy's contract production control plan. This

Showing a Ransohoff conveyor type wash, rinse and dry cleaning machine



Clean
SMALL PARTS PLAY A BIG PART IN *Your* WAR EFFORT

RANSOHOFF
EQUIPMENT
WASHES... RINSES... DRIES METAL PARTS
Automatically, Speedily, Economically

. . . that's where we come in, in a big way, right into the place where most needed

. . . for you can depend on RANSOHOFF EQUIPMENT to roll up its sleeves and jump into the job

. . . TO WASH, RINSE AND DRY SMALL METAL PARTS

IDEAL

Ransohoff Engineers are practical men with experience in solving your cleaning problem. Write us, Dept. IA, without obligation on your part for full details.

N. RANSOHOFF, INC. TOWNSHIP & BIG 4 RR CINCINNATI, OHIO

system, like the General Motors plan, looks good on the surface, but it will get its baptism of fire on only three contracts. If it works it may be extended. If not it will be scrapped. In any case, business can look forward to changes but observers here are confident they will cause far less confusion and be more workable than the early models.

•

Miscellaneous Machinery

• • • **In order to permit** application of PRP and the Governmental Requirements Plan (GRP) to certain types of industrial machinery, the WPB issued Amendment No. 3 to Amended Order L-83 on Aug. 27. The amendment permits preference rating certificates in the PD-25 series (PRP) and the PD-408 (GRP) series to be used by persons covered by the order. The GRP is a special method of issuing preference ratings for certain non-military federal agencies.

Among other exceptions, "approved orders" for machinery under the terms of Amended Order L-83 include any order bearing an A-9 or higher rating issued at any time on an original PD-1 or PD-1A certificate or by Order P-19h. Approved orders also include those with A-9 or higher ratings issued on a PD-3 or PD-3A, or any order in the P-19 series which was issued prior to May 18. Amendment No. 3 permits certificates issued at any time in the PD-25 series to be used to obtain maintenance and repair parts on orders rated A-9 or higher, and certificates in the PD-408 series to obtain machinery on similar rated orders.

For details of the Navy sponsored warrant system see page 76. Called the Contract Production Control Plan, it is a potential successor to PRP and the priorities system. Right now it is having a WPB-approved trial run on three Navy contracts.

•

Industrial Equipment

• • • **The preference rating** necessary to obtain certain types of industrial equipment covered by Order L-123 is raised from A-9 or higher to A-1-c or higher, except for Army, Navy and certain other exempted transactions, by Amendment No. 1 to the order, issued Aug. 27. Orders accepted prior to Aug. 27 for delivery before Oct. 1 are excepted. Certain other minor changes are made in the definition of the order, including an exception on two-wheeled hand trucks priced not in excess of $10.

•

Shipping Containers

• • • **Manufacture of pails** and tubs designed for use in shipping and packing is not limited under Order L-30. This is made clear by Amendment No. 7, issued Aug. 25 by the WPB.

The purpose of the amendment is to eliminate confusion which arose from Amendment No. 3 to the order, issued on June 12, which contained a provision to encourage the manufacture of wooden pails and tubs. It was not the intent of the original order

Specify JOHNSON BRONZE

For the ENGINEER

Practical data on SLEEVE TYPE Bearings covering such topics as Design, Alloys, Lubrication, etc. Write for the complete set.

• When you tackle the problem of new designs or new equipment . . . start with the bearings. No other item in a motive unit carries the same high degree of responsibility. When you want smooth, quiet performance . . . long, trouble-free operation . . . *Specify* JOHNSON BRONZE Sleeve Bearings.

The first step is to call in a Johnson Engineer. Permit him to study your applications . . . to make recommendations based entirely on facts . . . free from all prejudice . . . backed by more than thirty years experience. His knowledge covers the manufacturing of all types . . . cast bronze, sheet metal, babbitt-lined and powdered bronze. His services are offered without obligation. Write today.

JOHNSON BRONZE
Sleeve BEARING HEADQUARTERS
505 S. MILL STREET • NEW CASTLE, PA.

or Amendment No. 3 to restrict the use of critical materials in packing and shipping containers.

The original order curtailed the use of critical materials in the manufacture of a long list of kitchen, household and miscellaneous articles. Amendment No. 3 removed from the restrictions of the order any pail or tub which contains metal only in hoops, bails, ears and handles, provided the total weight of this metal does not exceed 15 per cent of the weight of the article.

The amendment also removes from Order L-30 restrictions on the use of critical materials in fireplace grates and dampers. However, restrictions on the manufacture of fireplace equipment continue in effect under Order M-126.

National Emergency Alternate Steels

Designation	Chemical Composition (b)				
	C	Mn	Mo	Ni	Cr
NE8024	0.22-0.28	1.00-1.30	0.10-0.20	....	....
NE8124	0.22-0.28	1.30-1.60	0.25-0.35	....	....
NE8233	0.30-0.36	1.30-1.60	0.10-0.20	....	....
NE8245	0.42-0.49	1.30-1.60	0.10-0.20	....	....
NE8339	0.35-0.42	1.30-1.60	0.20-0.30		
NE8442	0.38-0.45	1.30-1.60			
NE8447	0.43-				
NE8547	0.43-				
NE8620	0.18-				
NE8630	0.27-				

Will the Machinability of NE Steels prove to be a Tough Problem?

Stuart's Thred Kut
HEAVY DUTY CUTTING OIL
Recommended by America's leading machine tool builders

Stuart's SOLVOL
LIQUID GRINDING COMPOUND
For carbide tools and where an "aquamix" solution is recommended

Stuart's CODOL
LIQUID GRINDING COMPOUND
Meets every test for the ideal Modern Grinding Compound

Stuart's "SUPER-KOOL"
AMERICA'S FIRST TRANSPARENT SULPHURIZED CUTTING AND DRAWING OIL

THE answer will be "Yes" or "No"—depending upon the skill used in handling the change-over.

Changes may be required in tools and tooling; changes in speeds and feeds, *and in cutting fluids.* When this last factor is considered

Stuart Oil Engineering Service

is equipped and ready to help you apply the *Right Cutting Fluid* to "cranky" steels.

For All Cutting Fluid Problems
D. A. STUART OIL CO.
Chicago, U.S.A. • LIMITED • Est. 1865
Warehouses in All Principal Metal Working Centers

Complete Allocation For Civilian Rubber

• • • **Effective Sept. 1** all types of rubber — crude, latex, reclaimed, and scrap, came under full allocation control as far as their use in civilian products is concerned. This change from the previous system of rubber control is contained in a revised supplementary order, M-15-b, which consolidates the original order and 13 amendments. Specific WPB authorization is now required for the use of rubber in civilian products, and the WPB states that these authorizations will be issued from month to month or from quarter to quarter. Further revision is expected in the near future to restrict rubber use for war orders to specific classes of products.

•

Manufactured Gas

• • • **Delivery** of manufactured (artificial) gas to new industrial and domestic consumers was restricted by issuance of Order L-174 on Aug. 25. The order is a companion to L-31, issued last winter to control natural and mixed gas. The new order restricts deliveries after Sept. 1 on the basis of previous use and conversion dates, but allows deliveries of gas to new buildings when gas burning equipment is installed prior to Nov. 15, if the foundation of the structure was complete on Sept. 1. Other rules are laid down to determine priorities of customers in the event of scarcity. The action was taken to prevent conversions to gas caused by the eastern oil shortage.

•

AA-1 and AA-2 Ratings On M-21 Related Forms

• • • **A revision** in the method of filling out forms PD-138 and PD-139 was announced last week in a notice to all iron and steel products manufacturers operating under Order M-21. Amendment No. 4 to Priorities Regulation No. 1, issued Aug. 11 provides, in addition to preference ratings in effect, for preference rating AA-2x and further provides that "ratings of AA-1 and AA-2 are to be deemed ratings of the same grade, both ratings being equivalent to the present rating AA-1 and this rule shall apply to deliveries here-

tofore or hereafter rated with either of such ratings."

Effective at once in the compilation of Forms PD-138 and PD-139, preference ratings AA-1 and AA-2 should be recorded on line 03 as AA-1 and line 04 should be changed to read AA-2x for the purpose of recording the latter preference ratings.

•

Packing and Shipping Material

• • • **No material** of any nature that is to be used for packaging or shipping purposes may be ordered with a preference rating assigned under the terms of the repair, maintenance and operating supplies order P-100, according to Amendment No. 3 to that order, issued Aug. 28 by the WPB. Previously, this prohibition applied only to non-ferrous materials.

•

Freight Car Materials

• • • **Car builders** and suppliers can transfer surplus freight car materials to railroads, under an interpretation of Order L-97-a-1. The limitation order permits interchange of material between producers under certain conditions and with WPB approval. Interpretation No. 1, issued Aug. 26, makes it clear that railroads which produce or repair railroad equipment are deemed to be engaged in the same business as car builders, and thus are entitled to purchase surplus freight car materials from car builders and suppliers.

•

Storage Batteries

• • • **A program** designed to hold storage battery production at the minimum required for replacement purposes was made effective Aug. 29 by Order L-180. For the second half of 1942 replacement battery production is set at 90 per cent of the replacement production for the corresponding 1941 period. Only half this amount may be manufactured prior to Sept. 30. After Sept. 30 stock sizes will be reduced from about 100 to 17.

•

Heavy Trucks Authorized

• • • **Authority to manufacture** an aggregate of 4000 heavy trucks of a gross vehicle weight of 16,000 lb. or more was granted by the WPB last week to 15 producers in order to replace vehicles withdrawn from the civilian stockpile since June 1 by the Army, Navy and Lend-Lease Administration.

Trucks produced under the authorization (Supplementary Limitation Order L-1-h) must be held for rationing under General Conservation Order M-100. The authorization expires Dec. 31, 1942. Producers are authorized to schedule production of these trucks as though they were rated AA-4.

Cutlery Order Eased

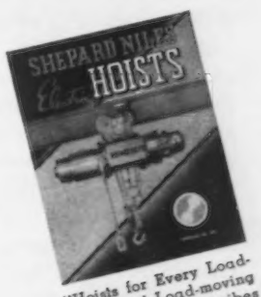
• • • **Exemptions** from restrictions on tableware, pocket knives, scissors and other cutlery are broadened by Amendment No. 1 to Order L-140, issued Aug. 25 by the Director General for Operations. The amendment exempts orders placed by the War Shipping Administration and military orders by jobbers, wholesalers and other dealers.

Direct purchases by the Army,

Overhead Load Handling
WITH LIFTABOUT ELECTRIC HOISTS

A battery of Close Clearance Liftabouts helps to maintain maximum production in this axle department.

Planned overhead load-handling with Liftabout hoists! That's the profitable way to meet production schedules. Liftabout hoists are playing an important part in speeding up production in every industry. Powered by heavy duty motors, designed especially for crane and hoist service—"Balanced Drive" heat treated gearing—antifriction bearings—automatic oil bath lubrication and precision control, are features that keep the Liftabout young, and everlastingly on the job.



"Hoists for Every Load-lifting and Load-moving Need" aptly describes this 48-page Catalog No. 127. Send for your copy today.

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A COMPLETE LINE OF CRANES & HOISTS
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Navy or Maritime Commission were the only orders exempted in the original order. However, the amendment makes it clear that the exemptions do not apply to cutlery purchased by post exchanges.

•

Canadian Priorities Division

• • • **Establishment of a division** to handle Canadian priorities problems was announced this week by the WPB.

PRP Rerating

• • • **Under the** provisions of Priorities Regulation No. 12, a PRP unit is permitted to change its rerating pattern twice a month on the basis of reratings which it has received. On Aug. 31 the WPB issued Interpretation No. 1 to the amended regulation to make it clear that the higher priority rating pattern so obtained is not applicable to the purchase of materials or equipment for plant improvement, expansion and construction.

•

Safety Equipment

• • • **Conditions under** which the Army, Navy and other federal agencies are permitted to obtain safety equipment using critical materials were established by the WPB in Amendment No. 3 to Order L-114. Uses permitted in the present amendment, issued Aug. 31, are largely for the maintenance of present vehicles, ships and aircraft.

•

Used Construction Machinery

• • • **All holders** of used construction machinery are required to register this machinery with the WPB, under the terms of Order L-196, issued Aug. 31. WPB had previously requested registration of this equipment, but last week's action makes such registration mandatory. Schedule A of the order sets forth the type of machinery subject to its terms.

•

Cutting Tools

• • • **Cutting tool** manufacturers will be required, after Oct. 1, to schedule 10 per cent of their total monthly production for each type of tool as specified in the order to meet original tooling requirements. The balance of their production is to be filled according to the provisions of Priorities Regulation No. 1. This action revokes the present order, E-2-a.

•

Order M-21-f Revoked

Washington

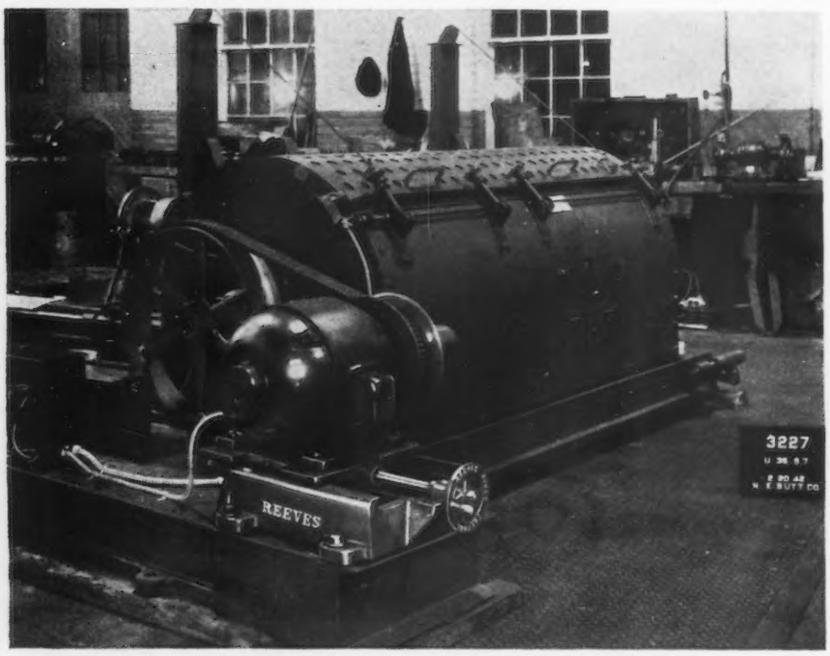
• • • **Order M-21-F** which provided for allocation of armor piercing shot steel, has been revoked by the WPB Director General for Operations. Order M-21-A, the alloy steel order, now provides for complete allocation of all alloy steel which includes shot steel. M-21-f officially will not be revoked until Thursday.

•

Copper for Vital Uses Only

Washington

• • • **The Army, Navy** and Maritime Commission have agreed to rigid restrictions that confine copper to vital war uses, WPB announced on Tuesday.



REEVES-REGULATED

For Twisting Different Sizes of Wire

● This bunching machine, used for twisting fine wire, is standardly equipped with a REEVES Vari-Speed Motor Pulley to provide complete speed adjustability. Any operating speed from 800 to 266 r.p.m., as required for handling different sizes of wire, is available at the turn of a handwheel—without stopping the machine. . . . The REEVES Vari-Speed Motor Pulley converts any standard constant speed motor to a variable speed drive, and provides accurate, stepless speed flexibility to all types of light h.p. machines for requirements not exceeding 3:1 ratio of speed change. . . . With two other basic units—Transmission and Motodrive—REEVES offers the only *complete* line of variable speed control equipment, and a nation-wide staff of seasoned speed control engineers to help you speed up war production. . . . Send for 120-page Catalog IG-419.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Reeves Speed Control

Price Schedule 49 Revisions Include Alloy Steel Formula

New York

• • • **Numerous changes** have been made in Revised Price Schedule No. 49, by Amendment No. 7, issued Aug. 29 and effective Sept. 4. Maximum delivered prices for l.c.l sales by jobbers of the new NE steels are established.

The amendment provides that all sellers of pipe and tubular products must file cutting and threading charges which were used on April 16, 1941, with OPA. These charges are to be used as maximums for such services under terms of the regulation.

The definition of "mixed carload" has been altered to state specific standards which constitute a mixed carload.

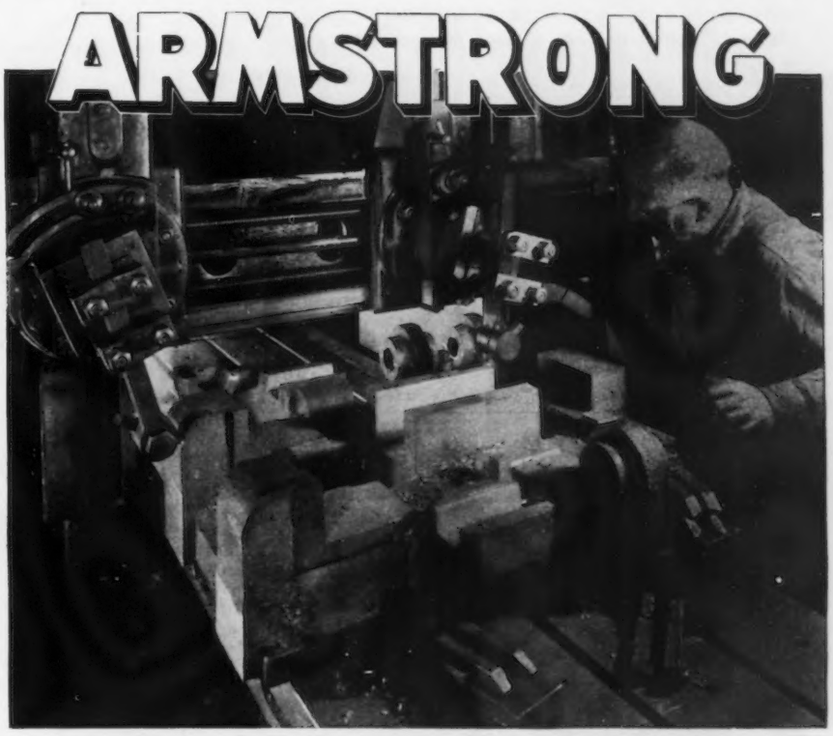
Dislocated tonnage provisions of the schedule have been altered, to clarify provisions for shipments of certain types of pipe in western territories. The provision establishes, in effect, a maximum necessary freight equalization of 30c. per hundred lb. on such pipe sold out of stock in certain western states and shipped into points within such states or to points west of the 103rd meridian within the states of North Dakota, South Dakota, Nebraska, and Texas.

Adjustments in prices of specified commodities on the West Coast have been made.

A section has been added as a result of the survey of the oil industry by OPC which disclosed that substantial quantities of oil country tubular goods and line pipe are in the field stocks of various oil and pipeline companies. It has been found that the services of a jobber may be necessary to move this material, which has been frozen. As a result, it is provided that a recognized tubular goods jobber has received prior written consent for the transaction from OPC, an additional charge may be made not to exceed 3 per cent of the price established in Maximum Price Regulation No. 204.

For the purpose of low-alloy steel pricing, basing point cities for hot rolled alloy steel are established as Bethlehem, Pa.; Buffalo, N. Y.; Canton, Ohio, Chicago; Massillon, Ohio; and Pittsburgh. Basing point cities for cold finished alloy steel are established as Buffalo, Chicago, Cleveland, Gary, and Pittsburgh.

The amendment provides that the maximum base price per 100 pounds for delivery by warehouses and other resellers of low-alloy steels within the free delivery area of basing point cities shall be the aggregate of the following, adjusted upward or downward to the nearest 5 cents: (1) the mill alloy base price, as established by Price Schedule No. 6 (Iron and Steel), at any basing point city (hot rolled or cold finished, whichever is applicable), (2) mill analysis extras, as established by Price Schedule No. 6 (open hearth or electric furnace, whichever is applicable), and (3) a mark-up of



ARMSTRONG PLANER TOOLS

Speed up any planing job!

With an ARMSTRONG Planer Tool for each planer head, you can start any planer job without waiting to "tool-up," for "tooling-up" is reduced to selection of cutters, adjustment of cutter angle and clearance and tightening the set nut. These permanent, all-purpose tool holders take cutters quickly ground from standard high speed steel "squares" or "flats". They hold cutters at any angle . . . right or left . . . and at any clearance, always permitting the most efficient approach to the cut. They hold cutters ahead of center for extreme rigidity, or behind center when "gooseneck" tool is wanted, as for keyways or for heavy cuts on especially tough steel. Because of the extreme adjustability of these tools, it is often possible to complete jobs requiring top and side planing, under-cutting and, sectional interrupted cuts without moving work on the bed of the planer. It is the most efficient planer tool obtainable for all planer operations, except where extremely large areas are to be surfaced. For large surfaces, the ARMSTRONG Gang Planer Tool is recommended, for it will cut planing time as much as 60%.

ARMSTRONG BROS. TOOL CO.

"THE TOOL HOLDER PEOPLE"

309 N. FRANCISCO AVE. CHICAGO, U. S. A.

Eastern Warehouse & Sales: 199 Lafayette St., New York, N. Y.

ARMSTRONG TOOL HOLDERS Are Used In Over 90% of the Machine Shops and Tool Rooms

66 2/3 per cent of the aggregate of mill alloy base price and mill analysis extras.

Base prices per 100 pounds for delivery at any destination other than the free delivery area of basing point cities shall be that combination of base prices for basing point cities plus less-than-carload freight rates in effect at the time of shipment from governing basing point to destination which results in the lowest delivered price.

Quantity extras shall be determined by combining the weight of one or more orders placed in one day, shipped at one time or at the seller's convenience, to one destination.

The item quantity extra, to be determined by quantity of one size, grade and finish shall be $1.25 per 100 lb. on an order of less than 300 lb., 75 cents per 100 lb. on an order of 300 to 499 lb., 50 cents per 100 lb. on an order of 500 to 999 lb., and no item quantity on an order of 1000 to 39,999 lb.

An order extra of $3 per 100 pounds may be charged on low-alloy steel orders which total less than 300 lb. If the order extra is applicable and charged, the item quantity extra for less than 300 lb. may not also be charged. Hot rolled alloys and cold finished alloys need not be combined to determine total weight.

A charge of $2.50 per 100 lb. may be made when the operation of heat treatment (quenching and drawing) or double treatment (both annealing and normalizing or spheroidized annealing) are performed by the seller. A charge of $1.00 per 100 lb. may be made when either the operation of annealing or normalizing only is performed.

•

Action Against Kaiser

New York

• • • **Federal Judge** R. N. Wilkins at Cleveland, on Aug. 27, issued a restraining order against the Kaiser Co., Inc., and Builders Structural Steel Co., Cleveland, from further alleged violations of OPA price ceilings on steel in Ohio. The restraining action resulted from a request by a regional OPA attorney, who charged that the enjoined companies "connived" in illegal actions.

OPA allegations stated that the companies connived in profiteering through wasteful freight charges by shipping in less than carload lots. OPA attorneys claim that the Kaiser Co. purchased 500,000 lb. of steel at above ceiling prices and that the Builders Structural Steel Co. was offering to sell an additional 400,000 lb. above ceiling prices.

Mr. Kaiser when questioned about the action said that it "may be an attempt to besmirch a legitimate concern earnestly engaged in prosecution of the war effort."

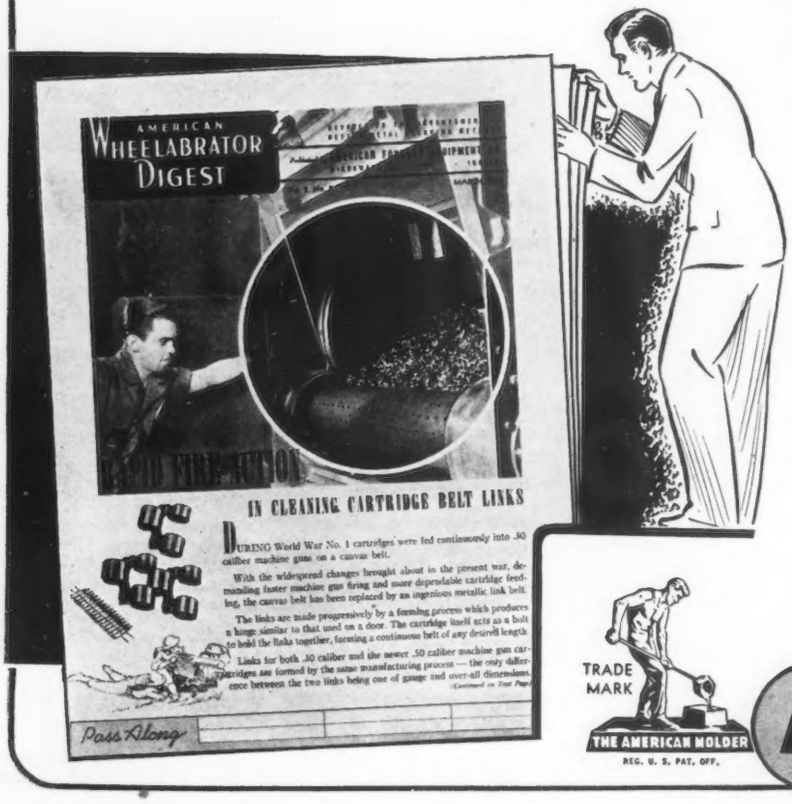
•

Price Schedule 20 Changed

New York

• • • **Revised Price Schedule 20,** copper scrap and copper alloy scrap, has been amended to permit small ingot makers who are able to secure necessary copper,

HOW TO KEEP INFORMED ON *Modern Metal Cleaning* PRACTICE



TO KEEP in tune with the latest developments in metal cleaning we recommend that you read the "Wheelabrator Digest," a bi-monthly publication crammed full of shop kinks and ideas that will help you speed up production and reduce costs in your cleaning room. We will be glad to add your name to our mailing list.

Contents of Recent Issues

Helpful Shop Kinks for the Cleaning Room
Increasing Tool Life by Wheelabrating
Removing Burrs from Machined Parts
Cleaning Shells and Bombs
Finishing Shoe Lasts Before Metallizing
Cleaning Pipe Inside and Out
How to Conduct an Abrasive Performance Test
Cleaning Cartridge Belt Links

TRADE MARK
THE AMERICAN MOLDER
REG. U. S. PAT. OFF.

AMERICAN
FOUNDRY EQUIPMENT CO.
510 SOUTH BYRKIT ST. MISHAWAKA, INDIANA

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

M Orders:

M-15-b...Amended order places civilian rubber under allocation and consolidates original order and 13 amendments (8-25-42).

M-161...Amendment No. 6 (8-26-42) removes inventory restrictions on silicate of soda.

P Orders:

P-100...Amendment No. 3 (8-28-42) prohibits the ordering of material for packaging or shipping purposes on ratings assigned under this order.

L Orders:

L-1-h...Supplementary limitation order authorizes manufacture of 4000 trucks of 16,000-lb. gross weight or over (8-28-42).

L-4-b...Superseded by L-180 (8-29-42).

L-26-b...Revoked Aug. 27, 1942, because disposal of surplus inventories is now provided by P. R. No. 13.

L-35...Superseded by L-180 (8-29-42).

L-83...Amended order permits persons covered by the order to use preference rating certificates in the PD-25 and PD-408 series (8-27-42).

L-180...Limits storage battery production during second half of 1942; restricts stock sizes effective Sept. 30 (8-29-42).

L-97-a-1...Interpretation No. 1 (8-26-42) places railroads in the same class as car builders for purposes of transfer of surplus freight car materials.

L-123...Amendment No. 1 (8-27-42) raises preference ratings required to secure equipment covered by this order.

L-174...Restricts delivery of manufactured gas to new industrial and domestic consumers (8-25-42).

M-9-c...Amendment No. 6 (8-31-42) changes the "military exemption list" of the order.

L-114...Amendment No. 3 (8-31-42) establishes rules for service purchases of safety equipment.

L-196...Requires all holders of used construction machinery to register it with WPB (8-31-42).

E-2-a...Superseded by E-2-b (8-31-42).

E-2-b...Sets up production schedules on cutting tools (8-31-42).

No. 12...Interpretation No. 1 (8-31-42) to amended regulation points out that higher ratings based on semi-monthly rerating pattern may not be applied to plant construction and improvement.

and copper alloy scrap for operations to file petitions for exception, despite the fact that he is unable to keep production at capacity (minimum requirement of 100 tons of brass and bronze ingot per month) because he does not have the necessary equipment to briquette all of the material required for his efficient operation.

•

Phenolic Resin Prices Set

New York

• • • **Bakelite Corp.** of New York City may sell and deliver from its plant at Bloomfield, N. J., phenolic type resin produced from the materials listed in the petition bearing Docket No. GF3-621 filed with OPA by Bakelite Corp. at prices no higher than those set forth:

Quantity	Price Per Lb. F.O.B. Point of Production
30,000 lb. or more	$.33
15,000 to 30,000 lb.	$.335
5080 to 15,000 lb.	$.34
Single drum to 5000 lb.	$.345
Less than single drum	$.385

No additional charge may be made for containers, but a reasonable container deposit may be required, providing such deposit is refunded upon the return of containers in good condition within a reasonable time; transportation costs with respect to the return of empty containers to Bakelite Corp.'s plant in Bloomfield, N. J., may be borne by buyer.

•

Silver Prices Issued

New York

• • • **Sellers of semifabricated** silver products were authorized Aug. 27 by the OPA to pass on to their customers the increased costs resulting from use of newly-mined domestic silver at 71.111c. per ounce in place of imported silver at 35⅜c. per ounce. At the same time, OPA authorized a maximum price of 71.111c. per fine ounce for standard commercial bars of newly-mined domestic silver for sellers who are unable to use March dealings to determine their maximum prices under Section 2 of the General Maximum Price Regulation.

Implementing an understanding between the United States and Mexico, OPA has authorized an increase in the maximum price at which silver bullion may be imported into this country from 35.375c. to 45c. a troy ounce.

•

Prices Set for Farmers' Nails

• • • **Prices of cut nails** used by farmers to stack or train peanut plants are brought under Revised Price Schedule 49 by Amendment No. 8 issued Aug. 31. On sales by distributers, the ceiling is cost from the mill plus 50c. per keg; on sales by persons who have bought from distributers, delivered cost plus 75c per keg; on sales by any other seller, a price approved by OPA after application. About 1500 tons of cut nails are involved.

•

Adjustment Under MPR 136

• • • **Maximum Price Regulation 136** (machines and parts) has been amended to permit adjustments for Select-O-Phone Co.; Filtration Engineers, Inc., and International Telephone & Radio Mfg. Corp. The amendments are No. 8, 9 and 10.

•

Rebuilt Plant Slated For Marine Equipment

• • • **The Sager-Follansbee-Midwest Corp.** will spend $1,342,000 to rebuild and equip the former Warner Speedometer plant at Beloit, Wis., to produce material for merchant marine ships.

•

"What-Can-I-Do" War Booklet Offered

• • • **"What you can do** about the war" is now in print, according to James M. Landis, director of Civilian Defense. A new pamphlet recently distributed to all state and local defense councils gives appropriate suggestions of war work to be done by 73 occupation groups including accountants, bankers, barbers, clergymen, electricians, factory workers, machinists, photographers and many others. Copies of the pamphlet are available from local defense councils.

•

Delta Company Goes To Investment Buyers

• • • **The Delta Mfg. Co.,** Milwaukee, subsidiary of the Timken-Detroit Axle Co., has been sold to a partnership consisting of Marshall Field, Chicago merchant and publisher; Charles G. Cushing, New York and Chicago investment banker, and H. Campbell Stuckeman, Pittsburgh industrialist, who will be in charge of the plant.

WLB Minority Asks: 'What's a Contract?'

• • • **U. S. Steel Corp.** now has the WLB's answer to its dispute with the United Steelworkers of America, CIO, in the form of a directive order granting a 5½c. wage increase retroactive to Feb. 15 with union security and the check-off included. The decision of the board, made public Aug. 25, was the result of a unanimous vote by its members for the wage increase, collective bargaining rights and check-off.

However, a strong note of protest was registered by the WLB minority, which in this case was the employers, on the question of retroactive pay to Feb. 15. The vote on this issue was 8 to 4 with the employers bowing to the united strength of the union and public representatvies. It has been the corporation's contention since negotiations began that, if retroactive pay was to be considered it should not go beyond Aug. 9, the date on which their contract* legally expired as a result of the union's formal written notification of intentions to open negotiations. However, the opposition saw fit to make the order retroactive to Feb. 15, on which date Philip Murray is contended to have given sufficient notice of intention to negotiate in a press handout.

The dissenting opinion of the employer members on the retroactive pay issue read in part as follows:

"It may be said that the union had at any time the right to terminate the contracts on 20 days' notice and had notice of termination been given last February, the board unquestionably would have made the same wage award in this case as it did in 'Little Steel.'

"Failure to open up the contracts can be placed solely upon the union. Its reasons for not exercising its rights to open the contracts, in our opinion, carried no weignt.

"As indicated by the terms of the directive order, this board takes upon itself to wipe out contract commitments disregarding the fact that the labor movement has grown strong in claiming a contract a sacred thing—some thing that cannot be lightly dismissed.

"What reasons can be advanced for such disregard of the written word openly and voluntarily entered into?

"How can the directive order be reconciled with such questions as—

"Is not a contract a contract?

"Should not the decisions of this board rest on principles which no one can attack and no one can question?

"Are not questions of principles important when it comes to deciding cases presented?

"How can this board justify the union demand that wages in these cases be paid retroactive to Feb. 15 or any date back of Aug. 9?

"As ye sow, so shall ye reap. It is unfortunate that the public members of the board have voted with labor to disregard a fundamental principle and irrespective of whatever equities there may be, have voted against the sanctity of a contract—something so essential in all human relations even though it may be but a scrap of paper.

"Labor by pleading and voting as it has in this case invites repudiation and retaliation. Expediency and temporary advantage are not the stars to steer a true course by.

"Presently labor seeks more and more power in the halls of government but when the four representatives of labor on this board representing not only labor but government vote to impose a condition on employers such as they would never vote to impose upon unions, they show a sad lack of foresight and statesmanship.

"This decision will rise to plague them just as it will rise to plague the four members of the board representing the public. Those who cast the eight affirmative votes forgot that justice should be blind.

"Reluctantly, the employer members bow to the decision of the majority. That is democracy."

*Contract—An agreement between two or more persons to do or forbear something, especially such an agreement that is legally enforceable. (Webster's New International Dictionary.)

NEW NAZI BAITER: This new aluminum gun turret, carrying two 50 calibre machine guns will soon be protecting a heavy bomber against interceptors and fighters attaching from below. The turret, which protrudes about two-thirds from the ship, provides nearly a complete revolution for the machine guns. Shown examining the turret are members of the U. S. Army Air Force, the U.S.S.R. Air Force and executives of the Turret Div., Briggs Mfg. Co.

•

Aluminum Strike Threatens

• • • **Closely following** the WPB's "Big Steel" decision comes news of other labor disorders growing at a disturbing rate throughout the country. An impending strike of the Aluminum Workers CIO which leaves the strike decision up to their leader, N. A. Zonarich, with a strike vote of six out of seven plants marking their approval, threatens to take 32,000 men out of aluminum production in the plants of the Aluminum Co. of America. Zonarich declares that he will not

call a strike until he has met with company officials and a committee of local union representatives.

The drop in aluminum volume which would result from this strike might well have a strangling effect on the aviation industry but is more or less aided and abetted by a threatened strike of Wright Aeronautical Workers affecting five eastern plants. This strike, started by about 2000 workers in their Fair Lawn plant was a result of the company's institution of classifications and wage rates without the knowledge of the men, according to a union statement. Notable at this time is the fact that this minor revolt is being caused by an independent union known as the Wright Aeronautical Employes Association coincidental with the recent repudiation of a Navy "E" award by another independent union organized at General Electric. The Wright Aeronautical spokesman was at a loss to understand the men's attitude on the new company classifications inasmuch as no employee would have his wages reduced as a result of the new plan and many would stand to profit by the move. A minor work stoppage was felt but complete stoppage to the tune of 20,000 men was threatened. Federal Conciliator Irvin D. Shapiro was successful, however, in getting the men back to work and negotiations will follow.

Other strikes, wildcat and otherwise, are also in progress in war industries as exemplified by a production dispute which closed the core department of the new aluminum foundry of the Buick Division of General Motors a few days ago. Harlow H. Curtice, general manager of Buick called it a "wildcat," climaxing a definite attempt of the union to restrict production. The management claimed that the strike started after two 18-year-old apprentices were discharged for incompetence. The union, UAW (CIO), in a statement made by their president John McGill, claimed that the management had "set such a high production rate that workers couldn't meet it."

The management charged that the union had made "a definite attempt to restrict production," apparently, it was said, in an effort to revise a pay scale built on a piece-work basis. The strike was concluded after only two days during an all-night session led by Army officers, and state and federal conciliators. The Army, however, cracked down on the case of four workmen, said to have violated a no-strike pledge by picketing. Inquiry into the loyalty of these men is being made and meanwhile they are barred from the plant. Despite speedy settlement the strike is evidence of more labor dissension and holds grave possibilities of decreased war production.

•

Truck Driver Strike

Massena, N. Y.

• • • **Seventy-five** union truck drivers left their jobs Aug. 28, on four projects connected with aluminum production, protesting the discharge of seven workers. The union charged that the seven were discharged without notice in violation of their contract.

•

Walkout Blocks War Materials

Boston

• • • **The Boston & Maine** Transportation Co. had 60 members of their trucking division strike in what was described as an unauthorized walkout. This strike (AFL) is said to have tied up considerable defense material.

•

Sitdown in Crucible Office

Pittsburgh

• • • **A novel "sitdown" strike** by shop committee members of the CIO United Steel Workers of America in the executive offices of the Park Works of the Crucible Steel Co. of America was used to prevent a general strike of some 3000 workers.

A number of cranemen walked off the job but were persuaded to return pending conciliation of the dispute. Two other plants of the company in the Pittsburgh area may also be affected.

•

C-I Cranemen Walk Out

Pittsburgh

• • • **Cranemen in** the Farrell Works of Carnegie-Illinois Steel Corp. walked off the job Monday over a wage-grievance controversy. It is doubted whether the 1900 men in the plant affected can remain working as a result although early conciliation is expected.

Aetna-Standard Wins Award for Production

• • • **The first presentation** of an Army-Navy production award in the Youngstown district was made to the Aetna-Standard Engineering Co. of Youngstown, Ohio, at the company's Ellwood City, Pa., plant on Aug. 31. Brig. General H. C. Minton, district chief, Pittsburgh ordnance district, represented the Army and Navy at ceremonies before guests and employees. An appeal was made to employees to show the unbeatable American spirit. E. E. Swartswelter, president, accepted the award, and pins were presented to three veteran employees as representative of the staff.

WELDED SHIP PRODUCTION LOST PER MONTH
in U.S. SHIPYARDS by discarding excessive Electrode Stub Ends

MATERIAL AND LABOR LOST PER MONTH

If Stub End loss is ..... 3 1/3 inches
While Stub End loss should be ..... 2 inches
Useful electrode loss is ..... 1 1/3 inches

Useful Electrode lost as per cent of total length used ..... 9 1/2 %

SHIPS LOST PER MONTH

Length of Stubs	Number of Ships
2 inches	0
3 1/2 inches	5 1/2
4 inches	8 1/2
5 inches	13
6 inches	25

Approximate U.S. Cargo Shipyard consumption of Electrodes per month.. 10,500,000 lbs.
Usable Electrode lost per month ..... 1,000,000 lbs.

BURN ANOTHER INCH * BUILD ANOTHER SHIP

Courtesy of The Lincoln Electric Co. Cleveland, Ohio

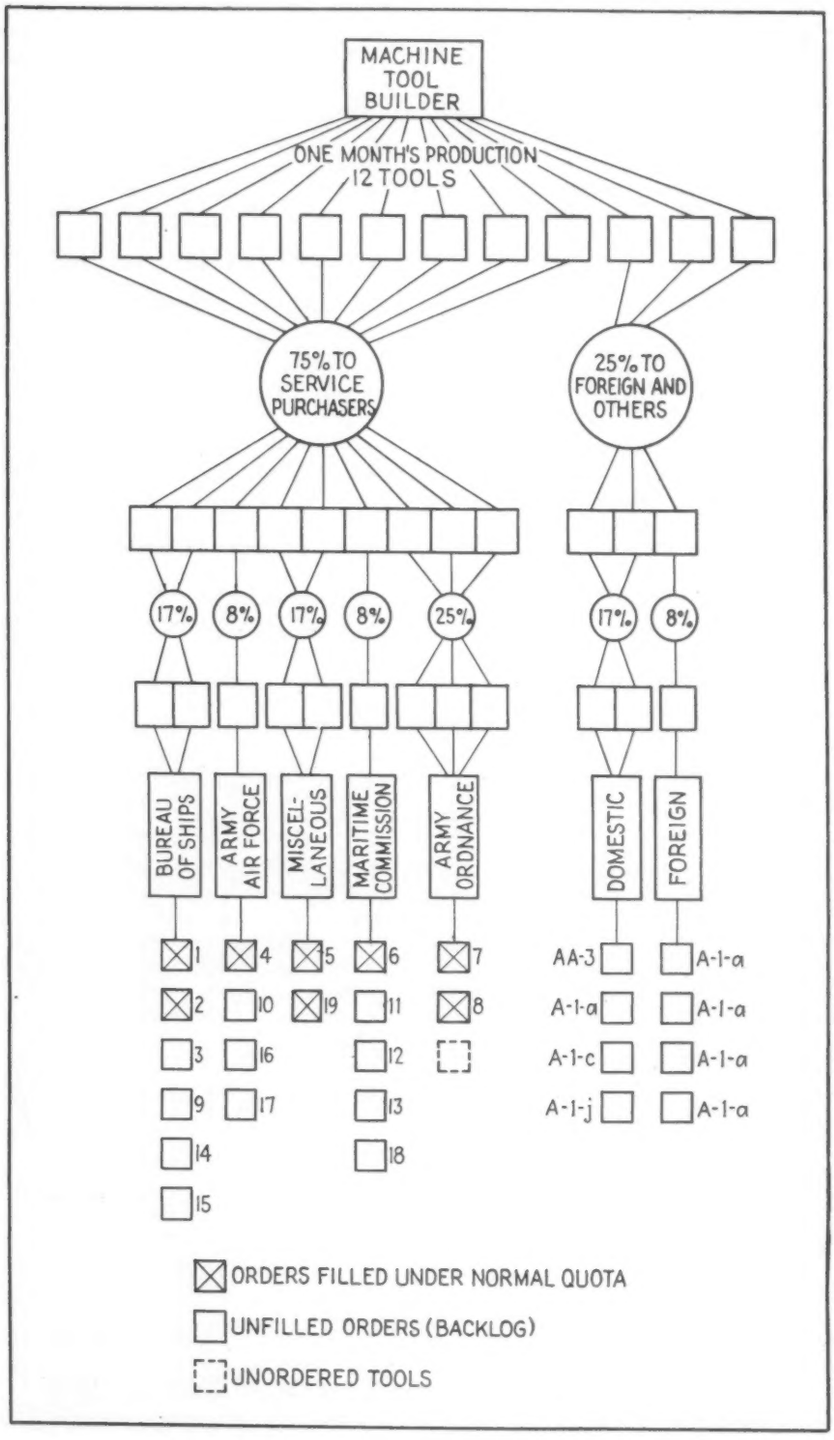
Machine Tool Allocation

THIS CHART SHOWS the method of assigning surplus machine tools under Amendment No. 1 to Order E-1-b, dated Aug. 13. As indicated by the dotted line square, one machine in the Army Ordnance quota was not ordered so it is considered surplus and consequently is available for delivery to another group that does not have all its orders filled.

Under the original system this surplus machine would have been assigned to the purchaser with the next highest urgency standing, i.e. No. 3, in the Bureau of Ships group. Under the Aug. 13 amendment, however, the surplus machine is assigned to the group with the greatest backlog in proportion to the number of tools the group is entitled to under its quota. Army Ordnance has a quota of 3, but ordered only 2 machines, so it has a surplus of 1 which must be assigned to another group.

The proportion of backlog to quota for the Bureau of Ships is 2 to 1; for the Air Forces it is 3 to 1; and for the Maritime Commission, 4 to 1. Thus under the amendment the surplus machine should be assigned to No. 11 in the Maritime Commission group because this group's proportion of backlog to quota is greatest.

The quotas in the service group are set by the Army and Navy Munitions Board; those in the 25 per cent group are determined by the Machine Tool Requirements Subcommittee. In this latter group, the sequence of deliveries is established by priority ratings, while the foreign order sequence is set up by the requirements committee on the recommendations of the Lend-Lease Administration.



OBITUARY...

• **Harold Clark,** assistant treasurer, assistant secretary, and personnel director of the International Nickel Co., Inc., died suddenly on Aug. 25. Mr. Clark had been associated with the metal industry for many years, starting in 1919 as registrar to the Mond Nickel Co., Ltd., London. In 1930 he was transferred to the New York Office of the International Nickel Co., Inc., taking the position of assistant treasurer, and later was elected assistant secretary and assistant treasurer, and in 1941 was appointed manager of personnel. He was also assistant treasurer and assistant secretary of the International Nickel Co. of Canada, Ltd., and the Whitehead Metal Products Co., a subsidiary of the International Nickel Co., Inc.

• **Harold C. Ryder,** advertising and sales promotion manager of the Hayward Co., New York, died suddenly on Aug. 15. He was 49 years old. After leaving school Mr. Ryder entered the employ of the Hayward Co. in 1907. Here his progress was rapid, and he was soon transferred to an important capacity in the sales department.

• **Thorvald H. Hansen,** consulting engineer for General American Transportation Co., Chicago, died Aug. 20, at his home in Milwaukee. He was 70 years old. Previous to his association with General American, Mr. Hansen was employed by the A. O. Smith Co. for 18 years as chief engineer and as general manager and by the American Brass Co. as chief engineer. In 1932 he purchased the Cedarburg Mfg. Co. and began production of the Thor outboard motor which he designed himself. In 1937 he sold this plant and undertook consulting engineering work. In this latter capacity he designed the prefabricated houses that were manufactured until recently by the Harnischfeger Corp.

• **Louis W. Marbes,** an erecting engineer for the Vilter Mfg. Co., Milwaukee, for 25 years before his retirement some time ago, died at his home in Boltonville, Wis. He was 82 years old.

PERSONALS

• **W. J. Reagan** has been appointed as melt shop research metallurgist with the Copperweld Steel Co. in Warren, Ohio. Mr. Reagan was previously connected with the Edgewater Steel Co.

• **Charles S. Duvall,** former vice-president of the Maryland Bolt & Nut Co., Baltimore, has been made president. Mr. Duvall has been associated with the company since 1920 and succeeds the late S. Forry Laucks, who served as president from 1923 until his death on April 11, 1942.

• **J. F. Van Nort** has been appointed general sales manager of the Duff-Norton Mfg. Co., Pittsburgh. Mr. Van Nort formerly served as Western division sales manager for the company. Before his affiliation with Duff-Norton, Mr. Van Nort was sales manager of the Eastern division of the Oil Well Supply Co., a subsidiary of U. S. Steel Corp. He joined the sales staff of Duff-Norton in 1940 and eventually succeeded the late Mr. Alex Anderson as Western division sales manager.

• **David G. Fleet,** general manager of Consolidated Aircraft, San Diego, has joined Vultee Aircraft as executive vice-president. He will also act as direct assistant to G. M. Williams, vice-chairman of the Vultee board.

• **Roy M. Smith** has joined the Roller-Smith Co., Bethlehem, Pa., as assistant chief engineer. Mr. Smith goes to Roller-Smith from the Bryant Electric Co., where he was engineering manager for the wiring device division. Prior to this, he was with the Westinghouse Electric & Manufacturing Co. as section engineer on relay design and application.

• **Frederick Detweiler,** now factory accountant at Pratt & Whitney Aircraft, has been named division accountant and assistant secretary of the United Aircraft Corp. of Missouri, Kansas City. **George Knaus,** facility accountant at Pratt & Whitney Aircraft, has been appointed assistant treasurer and assistant secretary of the company. Mr. Detweiler went to Pratt & Whitney Aircraft in 1933 as factory time keeper after graduation from Denison University, Granville, Ohio. He was accounting clerk and factory payroll accountant before becoming factory accountant in November, 1941. Mr. Knaus was employed as facilities accountant in February of this year, leaving the post of chief project auditor for the War Department at the Memphis, Tenn., General Depot.

W. J. REAGAN, metal shop research metallurgist, Copperweld Steel Co., Warren, Ohio.

• **John R. Beers,** who has been connected with the sales organizations of the United States Steel Corp. subsidiaries since 1920, has been advanced to manager of the Milwaukee office of the Scully Steel Products Co. to succeed **John E. Hayes,** who has retired. Mr. Beers has been in the Milwaukee office since 1938.

• **William R. Robbins** has been appointed division accountant and **James R. Seaman** has been named assistant treasurer and assistant secretary of Pratt & Whitney Aircraft. Mr. Robbins joined United Aircraft in March, 1936, as assistant general accountant. In July, 1940, he was named assistant treasurer and assistant secretary of Pratt & Whitney Aircraft, positions which he has since held. Mr. Seaman went to United Aircraft & Transport Corp. in 1929.

• **William N. Grooms** has been appointed district sales agent of the Roller-Smith Co., Bethlehem, Pa. Mr. Grooms will handle all Roller-Smith products in the States of Utah, Idaho, Montana and Southwest Wyoming. He will maintain offices at 630 Dooly Block, Salt Lake City.

• **C. T. Nash,** formerly with the Square D. Co.'s New York office has been placed in charge of the new office at 146 Chestnut Street, Springfield, Mass., and **W. W. Hendrickson** has been transferred from the Charlotte office to open a new office in Greensboro, N. C., located at 303 Kensington Road.

• **R. W. Cornell** has been named superintendent and **Frank Yusek,** assistant superintendent of the two plants of the Reliance Electric & Engineering Co., Cleveland. Mr. Cornell, formerly production manager of the company, joined Reliance in 1930. Mr. Yusek has been with the company since 1918; has been assistant production manager for the past year and a half. **K. H. Meyer,** works engineer, in addition to his present responsibility for tool design and plant engineering, assumes additional responsibilities for all manufacturing facilities. Mr. Meyer went to Reliance in 1926 following his graduation in mechanical engineering from Case School of Applied Science. **Walter H. Haber,** supervisor of production planning, will be in charge of a new production planning department. **Walter J. Rubin,** standards engineer with the company since 1937, will assume the functions of standard costs and cost estimating in addition to his responsibilities for manufacturing standards and routing of work. **W. J. Hall,** who has been in charge of the stores department in Plant 1 for the past seven years becomes general foreman of the new Plant 2.

• **F. D. Wild** has been elected president and treasurer of Warman Steel Castings Co., Los Angeles. **Wm. P. McGervey, Jr.,** has been named vice-president in charge of production and **H. T. Adams,** secretary.

• **J. T. Callahan,** with the B. F. Goodrich Co., Akron, Ohio, since 1928, has been named western district manager of the company's national sales and service division with headquarters in Chicago. He succeeds Walter W. Thomen, western district manager since 1939, who has been called to active duty as a major in the office of the Chief of Ordnance, War Department.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Copper "Order Blank" Devised by Government

• • • **The copper branch** of WPB has issued an "order blank" to make it easy for users of copper and copper base alloy products who hold the necessary preference ratings to purchase these products from owners of frozen, excess or idle inventories. While use of this form is not required to purchase metal from inventories listed by the Copper Recovery Corp., its use will speed up transfer of metal, WPB says.

Late this week, Copper Recovery Corp. will release figures on how much copper has been moved and how much allocated. Except for fragmentary totals issued a few weeks after the corporation began operations, these will be the first news on how the plan is progressing.

September copper allocations for all but small users were almost a week late, a delay attributed in industry circles to government work involved in the end use classification system.

Copper for fuses, other than current carrying parts, has been outlawed by WPB under order L-161, to save an estimated 1200 tons of copper annually. A yearly saving of 815,000 lb. of copper and the same amount of nickel is expected through a new silver-copper-manganese formula for nickels, according to the Philadelphia mint. An attempt is also being made to eliminate most of the copper in pennies, which last year consumed 7,200,000 lb. of copper. The Philadelphia mint has received no copper for pennies since June 1, and, using its reserves, has made only a million pennies a day, compared with an average of four million a day a year ago. It has not made a nickel since May.

Copper conservation order M-9-C has been revised concerning military exemption list. The new list narrows permitted use to planes, combat equipment and conductivity uses.

Failure to reduce substantially the production of replacement storage batteries gives further evidence that lead supply is not critical. The action was taken last week when WPB issued Order L-180 which cuts replacement production for the second half of 1942 to a figure only 10 per cent below the replacement production figures for the corresponding 1941 period.

No foreign silver purchases have been made by the government since November, all imports going to industrial users, the Treasury announced Sunday. Summarizing its efforts to make silver available for urgent war uses, the Treasury reported that its entire stock of non-monetary silver, 1,350,000,000 oz., is being lent to industry. The delivery of newly mined domestic silver acquired under forward purchase contract has been postponed and, according to the Treasury, two of the largest silver refiners are already delivering newly-mined domestic silver to industrial users.

Following negotiations with the government of Mexico, a new ceiling price of 45c. an oz. was placed on imported silver. The former price was 35.375c. According to the OPA, the increase will help pay a special emergency tax laid on silver by Mexico.

Bauxite deposits amounting to more than 500,000 tons have been blocked out in west central Georgia by the Department of the Interior, Bureau of Mines and Geological Survey. Over 200,000 tons are said to contain better than 50 per cent alumina, putting them in the Grade B class. It is anticipated that mining will begin promptly upon completion of the government's exploratory work.

Other nonferrous news: Tin savings of 30,000,000 lb. will be made in 1942 and 1943 by changed Army specifications, Lieut. General Brehen B. Somervell estimates, in an article in *Factory Management and Maintenance*. . . . The Bureau of Mines reports that nonferrous metals valued at $348,377,389 were recovered from purchased scrap and residues during 1941. . . . Titanium concentrate is being produced at the MacIntyre Development of the National Lead Co. in the Adirondacks, about one year after engineers arrived to start work on the titanium-iron property. (This development was described at length in THE IRON AGE of March 5, p. 53.) . . . Due to uncertain conditions in the zinc market, a leading smelter in the Chicago district has reduced prices sharply on all zinc scrap items. . . . For the first 25 years of this century, more minerals were used than in all previous history. . . . Ontario gold production for the first half of this year fell to a new recent low, $53,896,532 worth, compared with $60,857,331 the first half of last year. . . . The American Smelting & Refining Co. gas-retort zinc smelter at Amarillo, Texas, and the Machovec smelter of the American Zinc Co. of Illinois at Dumas, Texas, were operated at capacity throughout 1941. Additions to the latter plant increased its capacity 100 per cent since it was again placed in operation in February, 1940. . . . Brazil's mineral production has multiplied eight times in the last decade. . . . At least 30,000 laborers are to be conscripted for work in the Nigerian tin mines, almost doubling the present labor force. . . . The first tin plate plant in Portugal is reported about to be built by Societe des Acieries et Forges, a French steel company, which has received a Portuguese government concession.

The monthly average prices of the major non-ferrous metals during June were, in reality, the OPA ceiling prices set on those metals. These prices are as follows:

	Cents per Lb.
Electrolytic copper, Connecticut Valley	12.00
Lake copper, Eastern delivery	12.00
Straits Tin, spot, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Lead, St. Louis	6.35
Lead, New York	6.50

J. & L. Sets New Record

Pittsburgh

• • • **A blooming mill** crew at Jones & Laughlin Steel Co.'s Aliquippa plant last week made what is claimed to be a world's record when a Mesta blooming mill rolled out 500 five-ton ingots on a single eight-hour turn. A previous record on the same mill was 475 ingots, made several months ago.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Carlton Machine Tool Co. Gets Army-Navy "E"

Cincinnati

• • • **Officials of the armed services** and a number of industrial executives attended the ceremonies last week, at which the Army-Navy E award was presented to the Carlton Machine Tool Co.

Lt. Col. W. R. Martin of the Cincinnati Ordnance District presented the E pennant to Jack Carlton, president of the company. Comm. C. H. Bowman presented the employee emblems. Army and Navy officials who were guests of the company were Brig. Gen. W. O. Ryan of the Air Forces Concentration Command and Capt. E. D. Almy, U.S.N., of the Office of Procurement and Materials, Washington. Four more banners bearing the combined Army-Navy E will soon be displayed by four other Cincinnati machine tool manufacturers. Ceremonies will be held early this month for the R. K. LeBlond Machine Tool Co., Fosdick Machine Tool Co., Cincinnati Bickford Tool Co., and American Tool Works Co. The Navy E award has previously been awarded to the Lodge & Shipley Machine Tool Co. and the Cincinnati Milling Machine Co.

•

Machine Tool Builders Are Considering Direct War Work

Cleveland

• • • **With indications that machine tool** production is going to slide off, if it has not already done so, industry executives are seriously considering advisability of entering direct war work before it is too late. Industry spokesmen indicate that if machine tool builders put off the acceptance of direct war orders as long as possible, they may find later on that there are few desirable orders left which they can handle. At the same time, there is a growing feeling that if machine tool builders were performing direct war work they might secure better treatment in the matter of getting raw materials and in getting deferments for draftees. One machine tool builder told THE IRON AGE that 75 per cent of his requests for deferment were being turned down by draft boards.

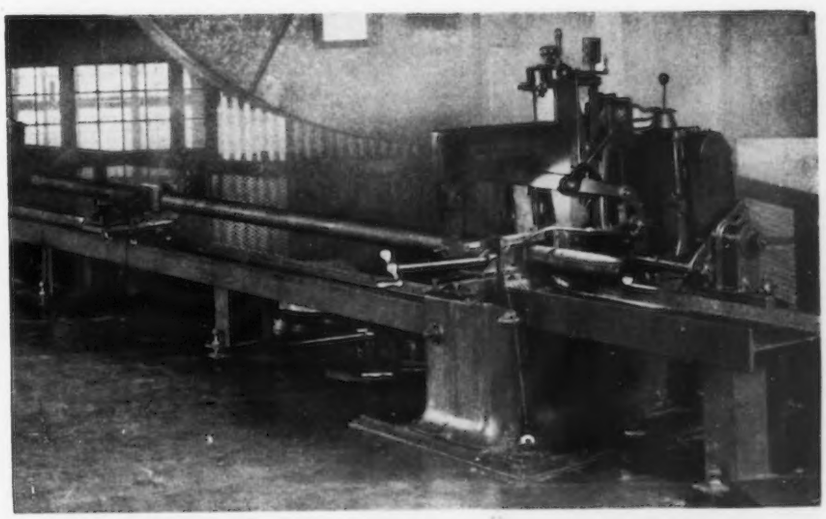
There are indications that machine tool production may have declined in August from the July peak, and that the September output may be even lower. This conclusion by industry observers is based upon the combined effects of material shortages, the drafting of experienced men, and the cancellations of orders resulting from wider sub-contracting. One authority pointed out that such a turning point in the industry is generally marked by some churning around in sales managerships and dealer relationships.

•

Order Level Maintained

Cincinnati

• • • **Manufacturers still report** some cancellations of business, but indicate that these are merely the result of purchasers finding other sources wherein more prompt delivery can be obtained. On the other hand, machine tool makers indicate that new business continues to come in to district offices and that by and large there has been little or no change in the condition of order books. Currently, commitments will warrant full production schedules well into next year, some say to at least the end of the first half and others well into the second half. While materials continue to be a serious problem, so far manufacturers indicate no delay in delivery as a result of slowness in obtaining materials, although some material has arrived only in the nick of time. With draft boards becoming less sympathetic to deferments because of essential industry, this problem continues to be acute. Here and there, in some plants, women have been employed, but so far this has not been a general thing.



cut-off metal the economical way

The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar.
For cast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin N. 600.

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SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Supplies Lower at Several Steel Plants

• • • **Scrap supplies** at several important steel plants, including one mill at Cleveland and one at Chicago, fell to a dangerously low point early this week, arousing fears that it might be necessary to close open hearths temporarily unless government allocations of scrap could be arranged to bridge the gap.

Public scrap drives over the nation were achieving moderate success in some areas and going poorly in other districts. The formation of Waste Materials, Inc., and the possibility that England might send some scrap back here proved encouraging developments to some persons in the scrap trade but the seriousness of the current situation seemed to indicate that too long a time had been taken before the inauguration of these movements.

In the opinion of some scrap market experts, the arbitrary stands on grading taken by some OPA inspectors are offsetting the public scrap drives. Cars of scrap have been turned down for reasons that have not been substantiated when the car was returned and unloaded.

If and when the long-expected drop in steel operations due to the scrap situation materializes, changes in the government's method of controlling scrap may occur. As long as mills can struggle along near the present operating rate not many changes are likely.

•

Stocks of Scrap Up June 30

• • • **Domestic stocks** of iron and steel scrap at consumers' suppliers' and producers' plants at the end of June approximated 4,859,000 gross tons, an increase of 6 per cent over the 4,602,000 tons reported one month earlier, according to the Bureau of Mines. Consumer stocks increased 8 per cent while supplier and producer stocks dropped 3 per cent.

Tomato Boom Slows Area Scrap Collection

Philadelphia

• • • Strange as it may seem, a bumper crop of tomatoes which must be delivered to local canners including the Campbell Soup Co., has so completely stripped the area of available labor and trucks that the local scrap collection is suffering. Hundreds of hands and an equal number of trucks, a part of which might normally be devoted to scrap collection, have been devoting their full time recently to hauling produce. The line of trucks awaiting unloading is said at times to have been seven miles long.

•

Scully New Head of OPA Iron and Steel Scrap Office

Washington

• • • **Edward A. France, Jr.,** Cleveland and John O. Levinson, Chicago, both of OPA's iron and steel scrap section, have taken up work with RFC's subsidiary, the Metals Reserve Co., to set up War Materials, Inc., a newly created salvage agency which is authorized to purchase scrap at above OPA ceiling prices.

C. D. Scully, Jr., formerly with the Pittsburgh Tube Co., succeeds Mr. France as chief of OPA's scrap section. He came to OPA in 1941 and has participated in all major developments in connection with the section's price regulations.

•

Scrap Demand Steady Leads 1941 Consumption

• • • **Domestic consumption** of iron and steel scrap during July was placed at 4,600,000 tons as compared with 4,608,000 tons in June, according to reports of the Institute of Scrap Iron and Steel,

In these times when quick repairs are of the utmost importance, when makers of experimental parts, when tool and die workers are busy, it will pay to have an ample supply of XLO Music Wire.
This high grade steel spring wire comes to you attractively packaged in red and silver in units of ¼ lb., ½ lb., 1 lb., and 5 lb. packages. Wire sizes from .003 to .200.
Johnson Steel & Wire has enlisted heavy production of XLO Music Wire for the war.
MUSIC WIRE
JOHNSON STEEL & WIRE CO., INC.
WORCESTER • MASSACHUSETTS
BRANCH OFFICES IN INDUSTRIAL CENTERS

Inc. This is up 185,000 tons over July of 1941 while the 1942 total for seven months shows 32,443,000 tons, an increase over last year's 30,948,000 tons. The year's total consumption is estimated at 57,000,000 tons, an increase of 2,500,000 tons over the 1941 total.

•

WPB Rewards Sixteen Eastern Scrap Dealers

Philadelphia

• • • **Sixteen scrap dealers** in Maryland, Delaware, Virginia and Pennsylvania were awarded the first WPB Scrap Producer Merit Awards Monday, a citation equal to the Navy "E" given to war production plants, according to an announcement by B. Randall, Jr., conservation manager of the WPB regional office here. The award is based on full cooperation with the WPB's national salvage program and tonnage one third higher than average monthly shipments for the first six months of the year. The award may be withdrawn from holders if tonnage does not stay up to present standards.

•

BUFFALO—Removal of 51 miles of abandoned steel rails in Buffalo streets will begin this week and is expected to net about 8600 tons of high grade scrap. The movement of scrap through district yards has slowed down in the last ten days and all grades are now fairly tight.

•

PITTSBURGH — Movement of scrap here is off 30 to 35 per cent in the past 60 days, according to some sources. This condition is blamed on a scarcity of material as well as fear of OPA reprisals for alleged violations. There is still some "bending over backwards" because no one wants to be accused of violations which were not intended. Mills are on a hand-to-mouth basis and drives are still lagging far behind what was expected.

•

CLEVELAND—Although one plant is in a comparatively favorable position, it is reported that another local division is operating on a day-to-day basis. The WPB has been scored by its delay in making allocations, thereby causing operational difficulties at some mills and foundries. It is pointed out that allocations permit shipments of dislocated tonnages of scrap over the ceiling price, but when the mills or foundries which have been getting scrap on allocations exhaust their current allocations, there frequently are delays in getting extensions.

•

BIRMINGHAM—Prospects for sufficient scrap to keep this district's mills operating at their present high level are not encouraging. The amount of material coming from auto graveyards is not completely satisfactory, and the harvest season has heavily reduced movement of country scrap. At a meeting here of WPB officials, announcement was made that a goal of 1,401,000 tons of scrap for the last six months of 1942 had been set for the Southeast.

•

CINCINNATI — Dealers generally look forward to an approved scrap situation, as the result of the organization of Waste Materials, Inc., at Pittsburgh. No change in the general market situation has been noted, dealers indicating that the flow of material to consumers is about equal to present needs. Results of the scrap collection activity in this area exceeded dealer expectations.

•

TORONTO—Fresh offerings of scrap in the Canadian markets dropped sharply during the past week or two and receipts by dealers now are running below actual consumption. Dealers, however, look for another large flurry before winter, after the harvest. Canada's scrap requirements this year will total 2,000,000 tons, but no difficulty is anticipated in meeting requirements of steel mills.

•

CHICAGO—The scrap supply situation in this area has taken a turn for the worse with respect to at least one large district producer. Early this week this company was reported operating with less than one day's reserve and it was predicted that unless the flow of scrap was considerably stepped up, it would be necessary to take off some open hearths. In other plants the situation is not quite as critical, but few operators see how it will be possible to continue present operations beyond December or mid-January unless greatly increased amounts of scrap are made available. Agitation for a flat f.o.b. price for scrap is being received somewhat coolly in scrap circles here.

•

PHILADELPHIA—Although mills here are still able to operate at a high rate, the scrap situation shows little change and certainly no improvement. The flow of scrap to mills is reported slightly slower than in the past two weeks but a part of this is attributed to a seasonal slow-up which is experienced in this area every year as a result of the harvest of vegetables which commands all available help and trucking facilities for a period beginning in late August and extending through September. Railroad scrap is at an all-time low but industrial scrap has consistently maintained a good level due to the high production rate of the area.

•

ST. LOUIS—Mills are operating comfortably on current receipts of scrap. Minor additions to stock piles are reported by two or three companies. Results of the government drive are exceeding expectations in many communities. Granite City Steel Co. has made plans for working over its slag pile with aid of an outside concern. This operation is expected to produce several thousand tons of scrap.

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IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)		BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
				Low Phos.		Heavy Structural and Plate			Cut Auto. Steel Scrap					
				Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under and Auto, Springs, and Crankshafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	18.85	19.85	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio		13.85	13.85											
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c.. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $2.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Clevelaud, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Composite Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Sept. 1, 1942	Aug. 25, 1942	Aug. 4, 1942	Sept. 2, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Sept. 1, 1942	Aug. 25, 1942	Aug. 4, 1942	Sept. 2, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel a re listed in the detailed price tables, pages 134 to 142 herein.

. . . Comparison of Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 1, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
			$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1941	2.30467c.,	2.30467c.,	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1939	2.35367c., Jan. 3	2.26689c., May 16	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1933	1.95578c., Oct. 3	1.75836c., May 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1932	1.89196c., July 5	1.83901c., Mar. 1	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1929	2.31773c., May 28	2.26498c., Oct. 29				

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

3 Ways to Save with Peerless Power Saws

PEERLESS 6" High Duty Saws with Hydraulic Feed are cutting SAE 1055, 485 Brinell shell stock after forging and piercing.

Pressure cannot build up — blade life is lengthened.

MANPOWER . . . TIME . . . METAL — all three elements are important in winning a battle or a war — all three elements effectively are conserved when the SAWING is done on a Peerless High Duty Power Saw.

The eight Peerless, High Duty Saws in action here are fully controlled hydraulically. The cutting cycle repeats automatically with minimum attention. Wartime MANPOWER effectively is conserved.

PRECIOUS WARTIME HOURS also are made more productive when Peerless Saws do the cutting. Peerless has the exclusive Four-Sided Saw-Frame with Backing-Plate Blade-Support. Faster cutting is practical — blade life is lengthened.

METAL, too, goes farther when it is Sawed to thousandths the Peerless way. The thin, cool-running, straight-cutting blade removes as little as 1/16" of the material. Even this fine "steel-dust" is easily salvaged from the chip tray.

All three savings* — savings in **MANPOWER . . . TIME . . .** and **METAL** are contributing much to the war production effort while helping more people save for War Bonds. More about this 3-way saving will be mailed on request.

PEERLESS MACHINE COMPANY • RACINE, WISCONSIN

Peerless
METAL SAWING MACHINES

PEERLESS MACHINE COMPANY, Dept. IA-942, Racine, Wisconsin

*Mail complete details on automatic performance .....

☐ Mail catalog on Hydraulic type Saw for High Production Cutting
☐ Mail catalog covering Vertical type used for Die Block Work
☐ Mail catalog on Mechanical type Saw for production cutting
☐ Mail catalog on generel utility and maintenance Saws

Company .....
Individual .....
Street .....
City ..... State .....

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.....	.25/.35	.....	.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.....	.20/.30	.....	.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.40/.60	.....	1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

Now's the time when a *Save to Win* policy is just what the doctor ordered. An ounce of prevention is better than a pound of cure, when you're caring for vital tools and equipment.

For instance, your long-lived, dependable Exide Batteries will last even longer if given reasonable, normal care. Follow these simple rules and *Save to Win.* That's good medicine for you, and bad medicine for the Axis.

MAKING BATTERIES LAST HELPS STOP THE AXIS!

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets *(7/16 in. and smaller)*

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws *Per Cent Off List*

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68[6]	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.48	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	....	....	4.10	....	3.90	3.80	3.95	4.10	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	....	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	4.05	....	....	4.30	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	4.00	....	....	4.30	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65[7]	....	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	9.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

. . . prevention of gas cutting fires

Information supplied by National Fire Protection Association

The surest way of preventing cutting and welding fires is to keep flames, sparks, molten slag and hot metal away from flammable materials. This elementary precaution is the most often ignored.

There are other precautions which, if observed, will do much to prevent cutting fires.

1. Always check fire hazards in new locations before starting work.
2. Have precautions in individual cases specified by responsible authority.
3. Move combustible material at least 30 to 40 feet away from cutting operation.
4. Sweep floors clean before lighting the torch.
5. If combustible material cannot be moved, or if sparks or slag may lodge in wooden structures, or drop through pipes or holes to floor below, use sheet metal guards, asbestos paper or curtains to localize flying sparks or slag.
6. Before cutting steel or iron be sure that it will not drop on combustible material.
7. When finished check surroundings thoroughly to make sure *all* smouldering sparks are put out.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Clima[illegible]-ly-[illegible]en[illegible]m [illegible]mpany
500 Fi[illegible] Ave[illegible] • [illegible]ew Y[illegible]rk City

MOLY

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick	*Per Net Ton*
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00
Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$34.00
As above, in bags, f.o.b. same mines	36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

ORES

Lake Superior Ores (51.50% Fe.)
(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

Foreign Ores*
(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.
Brazilian, 46-48 Mn	81c. to 83c.
Cuban, 51 Mn	85c.
	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$24 to $26
Tungsten, domestic scheelite, at mine	$24 to $25
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)	$28 to $30
Rhodesian, 45	Nom.
Rhodesian, 48	Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

	Per Net Ton
†Connellsville, prompt	$6.00

Foundry

†Connellsville, prompt ..... $6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.